

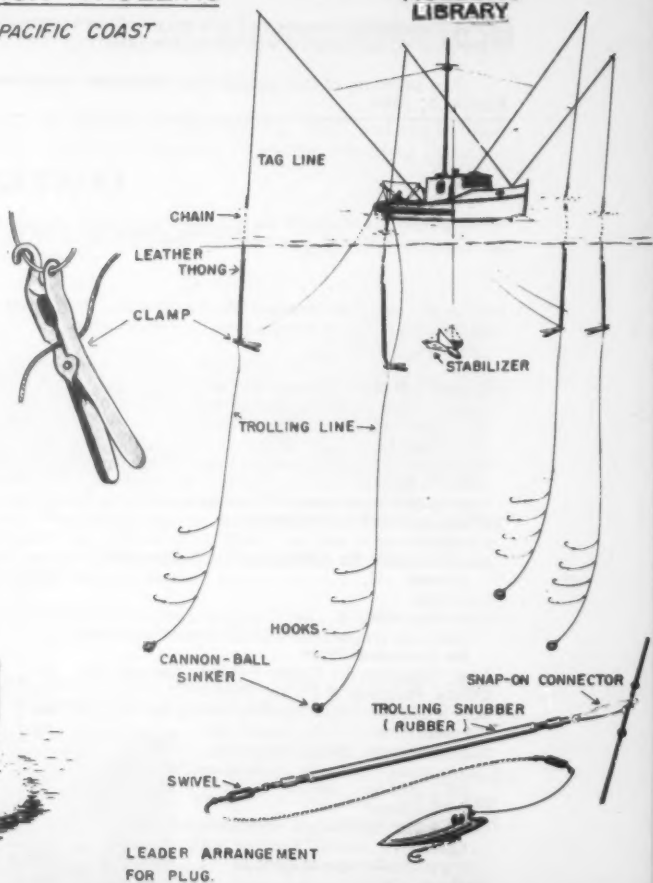
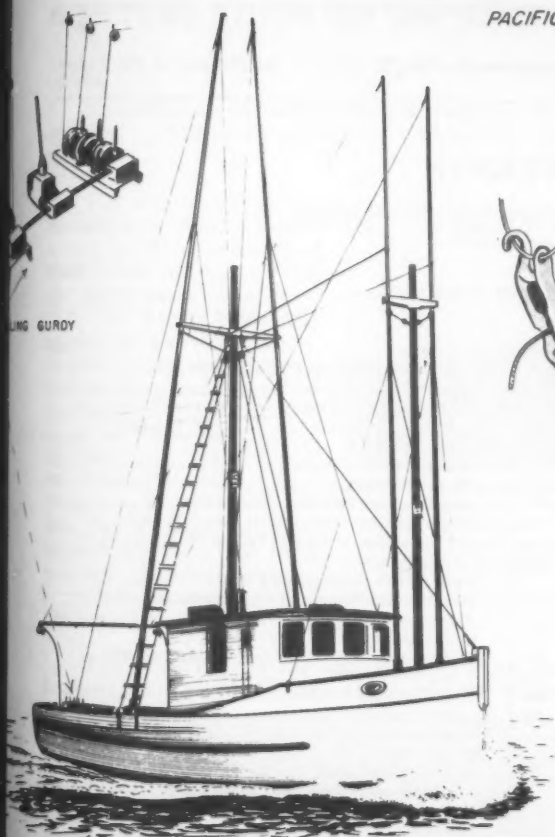
COMMERCIAL FISHERIES REVIEW

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MAY 1957

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United States Department of the Interior
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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
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A PICTURE STUDY OF AN AMERICAN WHALING OPERATION

By F. Bruce Sanford*

The whaling industry, long a romantic tradition in America, still exists in this country. This paper presents a pictorial study of modern inshore whaling operations.

For some years, there was an American whaling station at Fields Landing near Eureka in Northern California. The station closed down, however, as the result of

a fire in 1951. Since that time it has not been used for processing whales

(fig. 1). At the time this article was written (September 1956), the only active whaling operation in the United States was centered at Point San Pablo in Richmond, Calif., on San Francisco Bay. The reduction plants at Point San Pablo form an isolated community that long has been devoted to the reduction of fish (fig. 2). The processing methods are, in general, similar to those presented in Fishery Leaflet 126 (Butler 1949).



Fig. 1 - Site of whaling station at Fields Landing. This plant burned down twice, the last time in 1951. The building that was destroyed now has been replaced by one of metal construction, as is shown on the right. The plant is operated by the Hunter and Foland Company for the reduction of crab shells into meal and is not used presently for the reduction of whale.

The present whaling operation at Point San Pablo involves four separate organizations: the first catches and lands the whales; the second processes the whales

into meat; the third distributes the meat to animal feeders; and the fourth renders into oil and meal the parts of the whale not used for animal food.



Fig. 2 - Point San Pablo at Richmond, Calif. View showing some of the plants, where large quantities of sardines formerly were processed. Owing to the decline in the sardine fishery, a number of the companies at Point San Pablo are no longer in operation. The machinery, for example, in the Red Rock Fisheries building shown in the foreground, is being removed, and the building is being converted into a warehouse. The whale processing plants are located at the far end of the road.

The whales caught for this operation are mostly humpback (*Megaptera longimana* or *nodosa*), with only a small number of sperm whales (*Physeter catodon*) being taken (5 percent).

The humpback whale grows to a length of about 50 feet. Those used in the operation at Point San Pablo

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Fig. 3 - Truck with cut-up baleen.

Sperm whales feed in deeper water and on larger animal life than the humpback whales. The main food of the sperm whale is large squid. In contrast to the humpback whale, the sperm whale has teeth (fig. 5). The male sperm whale attains a length of about 60 feet and the female attains a length of about 38 feet. Only male sperm whales are found in this region.

The whales, at present, are taken by two catcher boats, the Donna Mae and the Dennis Gayle (figs. 6 to 9). Each boat has

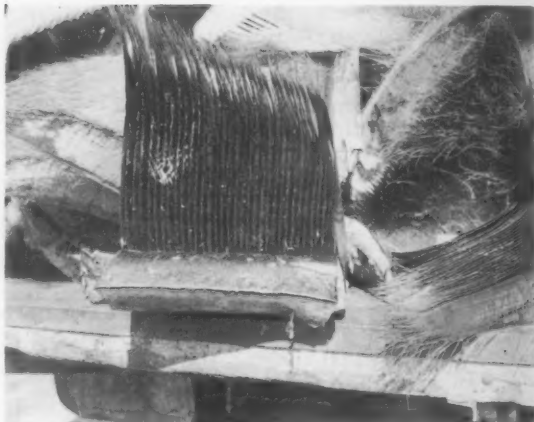


Fig. 4 - Close up view of baleen.



Fig. 5 - Mouth of a sperm whale. Note the teeth in contrast to the baleen in figures 3 and 4. Note also that there are teeth on the lower jaw only. The indentations in the upper jaw are tooth sockets into which fit the teeth on the lower jaw.

mounted on the bow a gun that shoots a heavy harpoon (figs. 10 to 14). The tip of the harpoon is armed with an explosive bomb, which usually kills the whale immediately (figs. 15 to 17).



Fig. 6 - Stern of the Dennis Gayle. Note that this vessel is also fitted for trawling.



Fig. 8 - Bow of the Dennis Gayle, showing the harpoon. This vessel, like the Donna Mae, is seldom in port, being at sea most of the time in search for whales.



Fig. 10 - Mounting of the harpoon gun on the Dennis Gayle.



Fig. 7 - Mounting of the harpoon gun on the Allen Cody.



Fig. 9 - The Allen Cody at Fields Landing. This catcher boat recently has been brought from Peru. It is not used presently in the Point San Pablo whaling operation, but may be used in the operation next year.



Fig. 11 - Views showing the bow of the Allen Cody. In the background is the Hunter and Folland Plant at Fields Landing, where bottom fish, crab, and shrimp are processed.



Fig. 12 - Gunner of the *Dennis Gayle* demonstrates the use of the harpoon gun. Note the sight bar.



Fig. 13 - Side view of the harpoon gun. Most whales are shot within 60 feet of the vessel. The whale gun is a muzzle loader having a charge of about $\frac{1}{2}$ pound of black powder.



Fig. 14 - Harpoon in gun. When the harpoon enters the whale, the rope lashing is shoved off the claws, which open and securely fasten the harpoon. When the gun is fired, the light line that secures the fore-gear and cable is broken. Occasionally, even the cable breaks under the tremendous force with which the harpoon is propelled.



Fig. 15 - Engineer of the *Dennis Gayle* demonstrates how the bomb is screwed onto the harpoon. The harpoon in the center shows what is left after the bomb explodes in the whale.



Fig. 16 - Bomb. Note the threads and the empty shell, which, when ready for use, is filled with 1 to $1\frac{1}{2}$ pounds of black powder.



Fig. 17 - Parts of the fuse. The fuse has a plunger, which is the small part at the center of the engineer's hand. When the gun goes off, the jar knocks the plunger against a cap at the bottom of the cylinder (by the engineer's thumb of his right hand), which ignites the powder in the plunger and in the head of the fuse. This powder requires about 5 to 10 seconds to burn. It then ignites the powder in the bomb head, which explodes and kills the whale. Note the method of inserting the fuse on the harpoon in front of the engineer.

The dead whale is drawn by cable and winch to the vessel, where the body cavities are pumped with air to keep the whale afloat. It then is secured to the bow of the vessel by a chain around the flukes and is towed to the whaling station (figs. 18 and 19). Here it is drawn into the station tail first (figs. 18 to 21).



Fig. 18 - Del Monte Fishing Company, showing the Dennis Gayle with the sperm whale that it just has brought to port.



Fig. 19 - Sperm whale. Only a few sperm whales are processed here; most of the whales are of the hump-back variety.



Fig. 20 - Making ready to pull the whale into the station. Note the cable in the foreground. The small rowboat is named the Moby Dick, Jr.

The whale is cut up as follows:

1. Strip off the blubber from both sides of the whale with the aid of a winch (figs. 22 to 26).
2. Remove the jaw bone.
3. Remove, from one side, the long loin that runs from the shoulder to the tail and then turn the whale over so that it lies on its back.
4. Strip off the belly blubber.
5. Remove the head (fig. 27).
6. Remove the other long loin.
7. Remove a shoulder, exposing the belly cavity.



Fig. 21 - Tail of the sperm whale after a part has been removed. Note the incisions on the body of the whale. These incisions are for the removal of the blubber, as will be shown in later photographs.



Fig. 22 - Making incision in the sperm whale preparatory to removing the blubber.

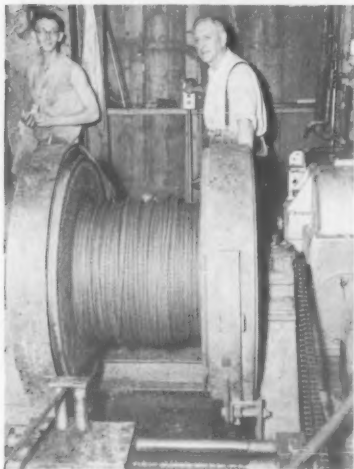


Fig. 24 - One of the winches employed in handling the whale. By use of this winch, the blubber is peeled from the whale like the skin from a banana.



Fig. 23 - Cable-block. At the end of the cable in the worker's hand and hidden by the jaw of the whale is a block of wood. In removing a strip of the blubber, the worker chops a small hole in the end of the strip, which has been peeled from the whale for a short distance. The cable shown in the worker's hand is passed through this hole, and the block of wood at the end keeps the cable from going on through. The cable then is attached to a winch.



Fig. 25 - Removing blubber from the head end of the whale.



Fig. 26 - Removing blubber from the tail end.



Fig. 27 - Sawing the headbone of a humpback whale. The saw is similar to one employed with timber. A clipper chain is being used.

8. Remove the entrails (figs. 28 and 29).
9. Remove the two small loins that extend from the belly cavity to the tail (fig. 30).
10. Pull the vertebrae away from the other shoulder.
11. Remove the meat from the shoulders and the ribs (fig. 31).
12. Cut up the bones.



Fig. 29 - Cutting fat from the entrails.



Fig. 28 - Taking meat from the vertebrae of a humpback whale preparatory to removing the entrails.



Fig. 30 - Cutting meat from the small loin.



Fig. 31 - Cutting meat from the shoulders and the ribs.

The meat is made into animal food by cooling, grinding (figs. 32 and 33), bagging, and freezing; and the resulting product is sold to animal feeders. Parts of the whale not made into animal food are rendered into oil and meal in a dry-rendering process (fig. 34).



Fig. 32 - Tractor for moving parts of the cut-up whale.

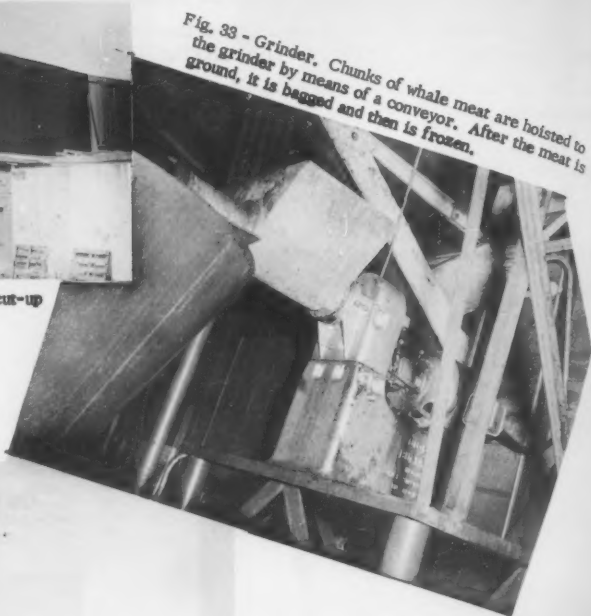


Fig. 33 - Grinder. Chunks of whale meat are hoisted to the grinder by means of a conveyor. After the meat is ground, it is bagged and then is frozen.



Fig. 34 - Rendering plant, where parts of the whale not made into animal food are converted into oil and meal.

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Bulter, Charles

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Note: The author gratefully acknowledges the generous help of Anthony Caito, President of Del Monte Fishing Company; Gib Hunter of Hunter and Foland Company; Captain William Bartow of the Dennis Gayle; Peter Gray of the Independent Renderers, Inc.; Dr. Raymond M. Gilmore, Research Biologist for the U. S. Fish and Wildlife Service Whale Investigations; and Vernald F. Relitz of Parr Richmond Terminal Company.



BULK HANDLING OF ALASKA HERRING MEAL

By Robert M. Kyte*

ABSTRACT

Herring meal can be stored in bulk without subsequent spontaneous heating by allowing it to go through its initial heating under controlled conditions prior to bulk storage, the findings in this report indicate. The technology of bulk handling of herring meal was investigated by plant observations, plant tests, and laboratory experiments. The spontaneous heating of stored herring meal is a major problem in bulk handling. Plant tests indicated 0.01 percent of an oil antioxidant added to the dried scrap reduced the maximum temperature observed in bulk-stored meal but did not eliminate heating. Laboratory experiments indicated that herring oil which had once spontaneously heated then cooled did not again spontaneously heat in the period studied.

BACKGROUND

Herring meal is produced in reduction plants on Kodiak Island, in the Prince William Sound area, and in the Chatham Strait area of southeastern Alaska. These producing areas are 700 to 1,400 miles from Seattle, the port of entry to the United States for most of the herring meal from Alaska. At the present time, herring meal is sacked in burlap bags holding 100 to 120 pounds of meal and shipped on barges holding approximately 440 tons of meal (fig. 1). A large portion of the herring-meal production is purchased by poultry-feed formulators who buy herring meal by the carload lot and who have facilities for bulk handling grain and other ingredients used in the mixed feed.



Fig. 1 - A tug taking loaded barges of herring meal and oil from a herring reduction plant in Alaska.

be offset by the capital expense of new equipment necessary for bulk handling. Cost of handling at the port of entry would also be reduced because the costs of unloading, when using modern bulk-handling equipment, would be significantly less than the costs of unloading sacked meal. But facilities different from those now being used for storing the meal at the port of entry would be required.

The purpose of this paper is to report findings made during an initial investigation of the technology of bulk handling of herring meal.

PLANT TESTS AND OBSERVATIONS

THE PROCESS: The method of producing herring meal in Alaska was similar in the six plants operating during the 1956 season. Essentially, the process consists of a cooker where the fish are cooked under 3 to 10 pounds steam pressure,

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a press where much of the oil and a portion of the water are pressed from the protein residue, and a direct-fired rotary drier where the press cake is dried.

HEATING OF SCRAP AND SACKED MEAL: Since heating was considered to be the major problem in bulk handling of herring meal, it was of interest to determine the temperature rise in sacked meal. This was done by measuring the temperature in the center of a sack of meal stored in a large warehouse, where the air temperature was 55° to 60° F.

(fig. 2). It will be seen that the meal temperature rose rapidly the first 2 hours after sacking and continued to rise in some cases for 6 to 8 hours or more and to as high as 168° F. The temperature of the unground material (scrap) rose rapidly to levels of the order of 225° F. during the first few minutes after it came out of the drier (fig. 2). These temperatures were measured 6 inches below the surface of a 2-foot pile of scrap.

ANTIOXIDANT TESTS:

It is believed that the primary cause of heating in bulk scrap and in sacked meal is the oxidation of the oil retained in the meal. Since it is feared that bulk-stored meal also will heat, owing to the same cause, a series of plant tests were conducted to determine the effectiveness of an oil antioxidant in preventing heating in bulk-stored herring meal.

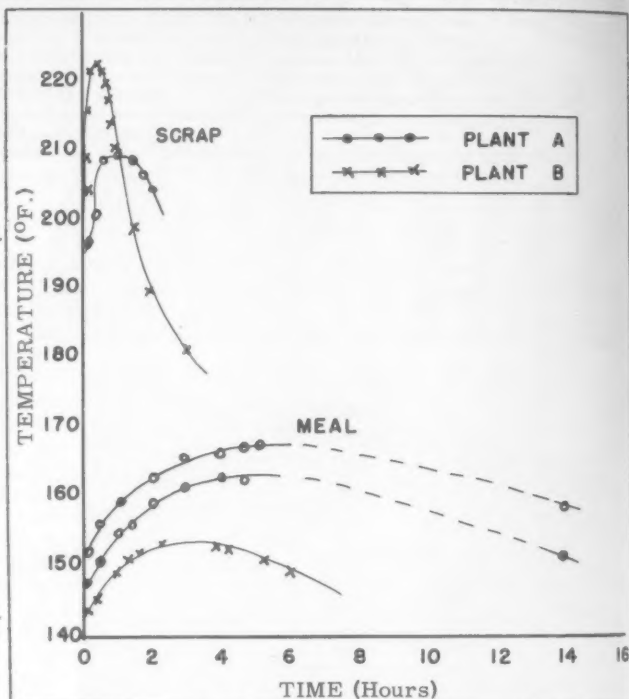


Fig. 2 - Rate and extent of heating observed in sacked herring meal and in herring scrap.

Santoquin (6 ethoxy-1, 2-dihydro-2, 2,4-trimethylquinoline) was selected as the antioxidant to use in the plant test because of its effectiveness as an oil antioxidant. It is an oily substance and was used as an oil-in-water emulsion in order to spread the small amounts required over a large quantity of material. The Santoquin-water emulsion was applied by spraying it on the press cake, or on the meal passing in a conveyor (fig. 3). The antioxidant was added at two levels: 0.08 percent and 0.01 percent by weight of dried meal. Preliminary laboratory experiments indicated that these levels would bracket the desirable application rate if the use of antioxidants were accepted.

Intimate contact between the antioxidant and the oil on the meal is necessary for the antioxidant to become of maximum usefulness. The antioxidant, therefore, first was added as early in the process as possible--to the press cake--in order to achieve maximum mixing in existing plant equipment. Because the advantage gained by intimate mixing in the drier might be offset by destruction in the drier, a second test was made adding the antioxidant to the meal just after it was discharged from the drier. The only mixing that the antioxidant and meal received under the latter conditions was in the 50-foot conveyor and in the meal grinder.

The extent of the spontaneous heating of the herring meal and the effect of the antioxidant at different concentrations and when added at different stages in the



Fig. 3 - Adding oil antioxidant to herring scrap leaving drier.

process were measured by storing the meal in cubicle bins 4 feet on a side. The heating curves of the meal, treated with two concentrations of antioxidant added either to the press cake, or just after discharge from the drier, are presented in figure 4. The heating curves of untreated meal are presented in figure 5. The heating observed in the antioxidant-treated meal was less and reached a maximum sooner than in the untreated meal.

BULK DENSITY: Bulk density is an important factor in determining shipping costs because the density controls the amount of meal that a barge of given size can carry. It also was suspected that meals with a high bulk density--those that were tightly packed--would show different heating characteristics from meals with a low bulk density. To determine the effect of bulk density on heating, we poured normal production meal

into two test bins. The meal in one bin, however, was tamped until it had a bulk density of 38 pounds per cubic foot. The loosely-filled bin had a bulk density of only 30 pounds per cubic foot. The heating curves of these meals are shown in figure 5. The lower-density meal heated slightly more rapidly than did the higher-density meal, but after 80 hours of storage, the temperatures in both bins were essentially the same.

The bulk densities of unpacked herring meal observed at three different herring plants at one time during their operating season were 30.0, 32.5, and 34.2 pounds per cubic foot. The differences among the meals might be explained by differences in the moisture content of the meal and in the herring from which the meal was prepared. The density of the meal sacked in the hold of the barge was estimated to be 35 pounds per cubic foot. This is an estimated 5 to 10 percent less than the density of a sack of meal but 15 percent greater than loosely-filled bulk meal.

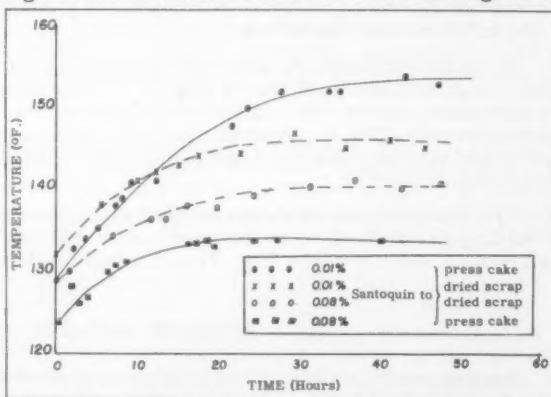


Fig. 4 - Heating of bulk stored meal--antioxidant-treated.

LABORATORY EXPERIMENTS

The plant-production variables of sacking temperature, moisture content, and bulk density of the meal seemed to affect the extent and the rate of heating of the herring meal. Laboratory experiments were set up to help explain the observed effects of these variables. In the laboratory experiments it was assumed that the major cause of heating was the oxidation of the oil.

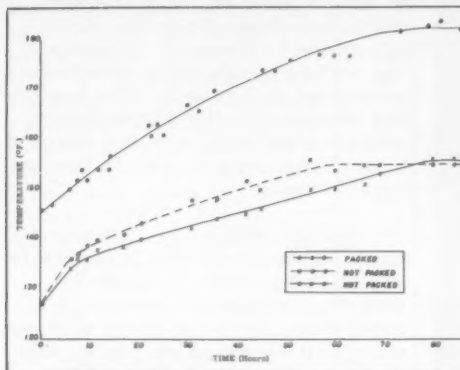


Fig. 5 - Heating of bulk-stored meal--untreated.

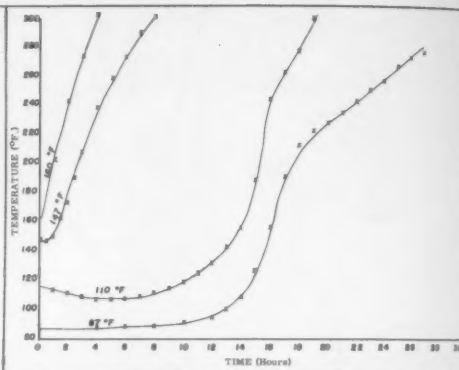


Fig. 6 - The effect of preheating on induction period of herring oil.

This oxidation was simulated in the laboratory by mixing herring oil with an inert support material that would expose a large surface of the oil to the air. The inert support used in the tests described here was composed of two parts by weight of silica gel and one part of the filter aid "Hyflow Super Cel." The oil was dissolved in four volumes of petroleum ether and then mixed so as to wet the support uniformly. The petroleum ether was removed by evaporation at room temperature (70° F.). Seventy-five milliliters of oil were used with 340 grams of the support. The oil-coated support was then placed in a vacuum flask and covered with a plug of glass wool, and the temperature in the center of the mixture was recorded.

At room temperature, spontaneous heating became apparent after an induction period of approximately 12 hours (fig. 6). Preheating the oil on the inert support reduced the induction period--the time before spontaneous heating becomes apparent--until, at approximately 160° F., spontaneous heating occurred at once. Oil that had gone through a period of spontaneous heating and had cooled did not heat again spontaneously even when preheated to 230° F.

The spontaneous-heating reaction was allowed to occur under controlled conditions by holding a sample of oil on the inert support at 180° F. for 4 hours. This sample was then cooled, and it showed (fig. 7) no further tendency to heat spontaneously.

RESULTS AND DISCUSSIONS

Spontaneous heating of herring meal occurs as soon as the meal leaves the drier (fig. 2) and probably is occurring in the last part of the drier where the moisture content of the scrap is almost as low as at the discharge. The spontaneous heating before sacking does not have an opportunity to cause a temperature rise in the meal because, under the procedures in herring plants, the heat is dissipated faster than it is formed. The spontaneous-heating reaction continues in the sacked meal where, because of the insulating characteristics of the meal, the temperature in the center of a sack of meal, under some conditions, rises to 170° F. or higher (fig. 2). Where the sacks are stored in small piles (four high) and in cool warehouses (50° to 60° F.), rapid dissipation of the heat occurs, and the spontaneous reaction is soon slowed to a rate that allows the heat to dissipate faster than it is formed.

Meal stored in bulk in test bins 4 feet on a side, however, dissipated heat more slowly and therefore exhibited a higher temperature than did sacked meal piled four sacks high (fig. 2 and 5). It is to be expected that the temperature of meal in the center of larger piles would rise to higher temperatures than those experienced in the test bins.

The addition of the antioxidant to herring meal did not reduce the initial rate of heat formation below that of the untreated meal. After the first 8 to 16 hours, however, the rate of heating of the antioxidant-treated samples fell much below that of the untreated meal, with one exception. This exception was the sample treated with 0.01 percent antioxidant added to the press cake. The fact that a large percentage

of the very small amount of antioxidant added to this particular sample was undoubtedly destroyed in the drier may account for this difference in reaction. The maximum observed temperature of all the treated meals was less than that of any of the untreated meals. The difference in maximum temperatures was dependent on treatment of the meal, on its initial storage temperature, and undoubtedly also on other operating variables.

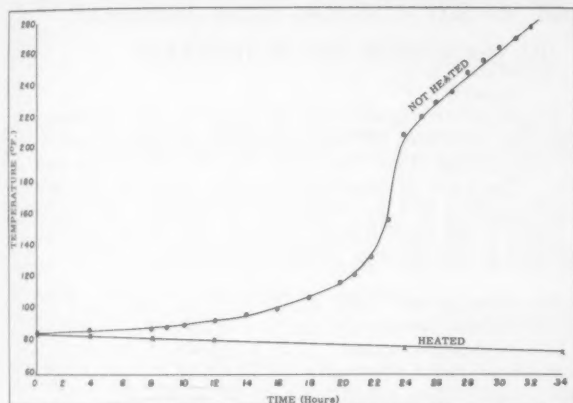


Fig. 7 - The effect of heating herring oil dispersed on support medium to 180° F. for 4 hours on subsequent spontaneous heating.

The antioxidant was effective in reducing both the maximum temperature rise of the bulk-stored meal and

the time to reach maximum temperature. Its action appeared to be one of inhibiting or stopping further oxidation after the rapid initial heating had occurred. Although it is suspected that the first heating is caused by oxidation, perhaps by that oil not mixed with the antioxidant, it is possible that an entirely different reaction is taking place.

Antioxidant added at the 0.01-percent level to the scrap leaving the drier gave protection against spontaneous heating. It is thus possible that even lower rates of addition of antioxidant than 0.01 percent might give satisfactory protection. Santogin is convenient to apply as an oil-in-water emulsion and, as such, can be applied by spraying the meal passing on a conveyor.

It is shown (fig. 6) that preheating the herring oil reduced the induction period (the time required for spontaneous heating to start). It is further established that spontaneous heating does not reoccur, within the limits investigated, in an oil-support mixture which has already undergone spontaneous heating. If the oil on the meal reacts in a manner similar to oil on an inert support medium, herring meal might be stored without the occurrence of spontaneous heating by allowing the meal to go through an initial heating before storage. It is possible that an additional processing unit might be installed to permit the rapid initial reaction to take place under controlled conditions before storage. An antioxidant might further reduce the possibility of subsequent heating.

The addition of antioxidants delays the formation, from the oil, of products not easily digestible. The nutritional value of a meal so treated might be significantly higher than that of untreated meal, particularly after prolonged storage. Samples

of the treated meals from these experiments have been sent to the University of California for evaluation in poultry nutrition to test the validity of these assumptions.

Because of the lower density of bulk herring meal, the barges now used to carry the meal from Alaska production points to such distribution points as Seattle, Wash., would hold about 15 percent less than when loaded with sacked meal, unless the meal were packed in the hold of the barge. This might be a significant factor in determining the economic desirability of bulk handling.

These observations and conclusions are based on limited tests during a short period in one operating season. Although it is believed that the data are representative, it is possible other variables not experienced might have an important effect on the results.

SUMMARY

Bulk handling of herring meal might offer significant savings to the Alaskan producer of herring meal. The primary problem in bulk handling is spontaneous heating. Spontaneous heating occurs from the time the meal leaves the drier and continues for 6 to 80 hours or more. The rate of heating is most rapid at the start. The addition of 0.01 percent of an antioxidant did not reduce this initial rate of heating significantly. It did, however, reduce the maximum temperature observed in bulk-stored meal and the time required to reach this maximum temperature.

Herring oil dispersed on an inert support and held at 180° F. in contact with air for 4 hours then cooled showed no further tendency toward spontaneous heating. If the oil in herring meal behaves in a similar manner, it is suggested that herring meal could be stored in bulk without subsequent spontaneous heating by allowing it to go through its initial heating under controlled conditions in the plant prior to storage.



ANTIBIOTIC ICE FOR FISH

"From what we hear on the scientific grapevine, antibiotic ice for fish may not be too far away," D. M. Haywood of Los Angeles, Calif., told delegates to the 12th annual convention of the National Fisheries Institute during the week of April 28 to May 1 in Chicago, Ill. "When we are permitted to use antibiotic ice," he went on to say, "a lot of our headaches will be behind us. Shipments of fresh fish from California to Maine will be commonplace."

Haywood, the first speaker of the Monday morning session of Customers Day, pointed out that "The very fresh fish we trade in, like all perishable commodities, makes us vulnerable." "We either keep up with modern trends and patterns, or else we don't stay in business very long. Our economy has changed from a 'need' economy to a 'want' economy. Fish sticks have given us a much-needed shot in the arm and--more important--have proved to us that the 'want' economy will work for fish as well as other products. Find out what the public wants, produce it, advertise it, and promote it."



RESEARCH

IN SERVICE LABORATORIES

TECHNICAL NOTE NO. 37 - USE OF BACTERIAL CULTURE TO AID SEPARATION OF MENHADEN OIL IN GRAVITY TANKS

ABSTRACT

Use of a starter culture to speed "break-out" is recommended in the gravity separation of menhaden oil. The bacterium involved is probably a member of the genus Clostridium.

Microscopic examination of press liquor obtained in the processing of menhaden has indicated that certain types of bacteria must be present for the optimum separation of oil from stickwater in gravity separation. The hot liquor pressed from the cooked fish--a complex mixture of oil, water, soluble fish-tissue compounds, and fine materials--escapes the screening process--is transferred to large tanks of approximately 5,000-gallon capacity. The oil separates from the press liquor and rises to the surface, producing a barrier that prevents air from getting into the lower level.

Semi-anaerobic conditions are produced as a consequence of the initial temperature of the press liquor (approximately 70° C.), the subsequent release of some of the dissolved air from the lower level, and the lack of further extensive aeration. During the following 8 to 10 hours, a thick layer of foam is formed over the surface of the oil, indicating that a proper "break-out" of oil has occurred. Water is introduced into the bottom of the tank, which raises the layer of oil to a trough by which the oil is transferred to another tank.

Samples for bacterial study of the press liquor or stickwater were obtained from a tank at the completion of filling, 1 hour after filling, and at the completion of the process during the flooding operation. Large loops full were

smear on glass slides, air dried, and fixed by heating in a gas flame. The preparations were stained for 3 to 5 minutes with crystal-violet, blotted, and viewed



TAKING OF DILUTION BOTTLE SAMPLE OF STICKWATER FOR PLATING OF BACTERIA.

under the oil-immersion objective lens of the microscope. Duplicate smears were stained by the conventional Gram stain procedure.

Examination of the stain preparations revealed a relatively pure culture of large gram positive bacilli, occurring singly and containing a central oval spore located terminally. Distention of the cell around the spore was evident. Preliminary investigation indicates that the organism is a member of the genus Clostridium. The organism is probably a proteolytic species, since there is little carbohydrate available in menhaden press liquor. This inference is supported by the fact that ammonia, liberated during active protein degradation, is detected in the tanks. In addition, hydrogen sulfide, methane, hydrogen, and other gases resulting from the anaerobic decomposition of protein often are evolved.

In this gravity separation method, initial separation of oil from press liquor is accomplished by taking advantage of the differences in the specific gravities of the two fluids. Large quantities of oil are held in the aqueous layer, however, by particles of insoluble protein, by emulsion, and by other physical and physico-chemical activity and complete separation of the oil from the press liquor is not attained. The importance of the microbiological activity is clearly evident, since a complete break-out of the oil does not occur in the absence of the proteolytic decomposition.

Processing menhaden into meal, condensed solubles, and oil is always a rapid operation carried out for meal on a tonnage, and for oil and solubles on a tank-car scale. Any interruption in the smooth flow of materials through the plant immediately creates a serious problem. When a tank of press liquor fails properly to show the required activity and the emulsion accordingly does not break, the operator usually is forced to take what oil he can and to discard the remaining intractable emulsion. Failure to break the emulsion results therefore not only in a substantial financial loss but creates a further problem in how to dispose of the emulsion as well.

In such cases of delay, it is recommended that the operator add 200 and 300 gallons of press liquor from a tank that has undergone a typical proteolytic activity. This added liquor will serve as a starter culture to promote the desired break out of oil in the inactive tank.

CONCLUSIONS

1. The maximum release of menhaden oil during gravity separation processing is due largely to a bacterial decomposition of the suspended protein. The active microorganism is an anaerobe and probably a member of the genus Clostridium.
2. Proteolytic activities of the organism appear responsible for more complete release of oil from protein-oil emulsions and other non-specific complexes.
3. Use of starter cultures to insure typical effective "break-out" of oil is recommended.

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PROGRESS ON FISH MEAL NUTRITIVE VALUE STUDIES

The term "fish meal" does not refer to a specific substance, for it applies to any dried material prepared from fish or from any parts of fish, such as fillet waste. When the different constituents of the fish--such as skin, muscle, bones, and organs, which may make up the raw material for fish meal--are considered, it can be seen that any one fish meal, by virtue of the raw material variability alone, is very complex. When this complexity of fish parts is compounded by the different species of fish used for fish meal being manufactured, the number of possibilities for variation becomes enormous. The amazing thing, therefore, is not that differences in nutritive value are found among the commercial fish meals, but rather that these differences are not larger than have been reported.

Since these differences do occur and since a standard product is desirable, it is important to learn the factors that affect the nutritive value of fish meal. The Technological Section of the Service's Branch of Commercial Fisheries, in cooperation with a number of collaborators, has undertaken such a study.



PREPARATION OF EXPERIMENTAL DIET TO STUDY PROTEIN QUALITY OF MENHADEN MEAL.

This study is being made on the effects of (1) the raw material used and its condition; (2) processing conditions employed; (3) storage conditions for the meal; (4) amount and availability of protein and amino acids in the meal; and (5) type, amount, and degree of oxidation of the oil in the meal. These variables are being studied through use of chick-growth tests that measure the effects of these variables on the unknown growth factors and the protein quality of the meals, as they may relate to the nutritive value of these meals. This approach can best be illustrated by describing for one particular sample of menhaden meal the studies

PREPARATION OF THE MEAL

PROCESSING: Menhaden press cake was obtained by staff members of the Technological Laboratory, College Park, Md., and shipped to Seattle, where the press cake was dried in a small steam-jacketed drier. In this work, press cake sufficient to supply 100 pounds of meal was dried in a single batch, ground, and thoroughly mixed. Part of the meal was then packed in nitrogen and sent to the various collaborators for animal-feeding and composition studies.

STORAGE CONDITIONS: The remainder of the meal was divided and stored both at room temperature and at -20° F. in atmospheres both of air and of nitrogen.^{1/} These samples will be tested by the following procedures after storage periods of 6 months, 12 months, and longer--if little or no change occurs within the 12-month period.

^{1/} NITROGEN WAS PACKED WITH THE MEAL TO EXCLUDE AIR. THE NITROGEN IS INERT AND DOES NOT REACT CHEMICALLY, WHEREAS OXYGEN IN THE AIR DOES REACT, ESPECIALLY WITH THE OIL IN THE MEAL.

ANIMAL-FEEDING STUDIES

UNKNOWN GROWTH FACTORS: Dr. H. R. Bird, of the Poultry Husbandry Department at the University of Wisconsin, is testing the meal for effects of unknown growth factors, according to the method described by Barnett and Bird (1956). In this chick assay, the growth response induced by the sample under test is compared with that of a sample of fish solubles that serves as a reference standard. Tests on the freshly-prepared meal now have been completed. The tests show that the relative growth response of the chicks fed this meal is excellent.

PROTEIN EVALUATION: Dr. C. R. Grau, of the University of California at Davis, is evaluating the protein in the meal. The procedure used is that of Grau and Williams (1955) and modified as described by Grau, Barnes, Karrick, and McKee (1956). The values obtained by feeding the freshly prepared meal to chicks indicated that the protein was of good quality.

COMPOSITION STUDIES

PROTEIN, MOISTURE, AND ASH CONTENT: The composition of the meal was as follows: protein, 59.3 percent; moisture, 9.2 percent; and ash, 20.5 percent.

OIL CONTENT: The apparent oil content of the meal varied with the kind of solvent used to extract the oil. (This problem of oil extraction is being studied in connection with another project. In this other work, it has been found also that the amount of oil extracted decreases with the length of time the fish meal has been in storage.) The initial values obtained with the present menhaden meal sample were 9.5 percent oil extracted with ethyl ether and 12.7 percent oil extracted with acetone. The amount of oil measured by the use of these solvents will be determined periodically as the meal ages. Any changes in the solubility of the oil with increased age of the meal will be checked by comparison with chick-growth studies to find out whether such changes are reflected in the nutritive value of the meal.

AMINO ACID CONTENT: The amount and availability of amino acids in the meal undoubtedly affect the quality of the protein. The question is whether *in vitro* (test-tube) assays of the individual amino acids give results that can be correlated with those of *in vivo* (in living tissue) assays of the protein.

Microbiological assays (*in vitro*) for amino acids are being made at the Wisconsin Alumni Foundation. A sample of the freshly prepared meal was analyzed for the total amount of 13 amino acids and for the proportion of these that was available to micro-organisms. This analysis will be repeated if the stored meal shows a deterioration in the quality of the protein as measured by the chick-growth tests (*in vivo*).

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IRON SULFIDE DISCOLORATION OF TUNA CANS

Certain batches of tuna, when canned, cause an iron sulfide deposit to form on the can area adjacent to the headspace. The deposit is caused by a reaction between sulfide from the fish and iron in the can. In a study jointly sponsored by the Continental Can Company and the U. S. Fish and Wildlife Service, investigations were made on the effects of retorting and cooking on the formation of black ferrous sulfide discoloration in canned tuna. Free sulfide was not found in the unprocessed fish but appeared in all canned tuna after processing. The amount of free sulfide was found to increase with longer retorting periods. Free sulfide did not form a black precipitate of ferrous sulfide unless the free iron in the ferrous state was available. Discoloration occurred in the cans during the cooling period and was greater in cans held at elevated temperatures while being cooled. Thus, one of the important considerations in the prevention of iron sulfide discoloration of tuna cans is a quick cooling period.



BAKED SHAD FILLETS

The annual cherry blossom festival in the Nation's capital and the appearance of an abundance of shad on the market heralds spring.



Regular as a clock each spring the shad migrate from the ocean to our coastal rivers to spawn above tidewater. They are found in the Atlantic from Maine to Florida and in the Pacific from Washington to California.

The shad range in size from $1\frac{1}{2}$ to 7 pounds and are most commonly sold as roe or buck shad. The meat from both is tender and white, with a distinctive flavor. The roe, from the roe shad, is considered a great delicacy.

Shad may be purchased whole, drawn, or as fillets. The fillets require no preparation for cooking as they are the sides of fish cut lengthwise away from the backbone. Shad fillets are delicious when prepared by any of the basic cooking methods such as baking, broiling, or frying. The home economists of the United States Fish and Wildlife Service suggest that you serve "Baked Shad Fillets" to your family to celebrate the arrival of spring.

BAKED SHAD FILLETS

2 POUNDS SHAD FILLETS	2 TABLESPOONS LEMON JUICE
1 TEASPOON SALT	1 TEASPOON GRATED ONION
DASH PEPPER	$\frac{1}{4}$ CUP BUTTER OR OTHER FAT, MELTED
1 TEASPOON PAPRIKA	

Cut fillets into serving-size portions. Place in a single layer, skin side down, in a well-greased baking pan. Combine remaining ingredients and pour over fish. Bake in a moderate oven, 350°F. , for 20 to 25 minutes or until fish flakes easily when tested with a fork. Serves 6.



TRENDS AND DEVELOPMENTS

Alaska

NO FEE IN 1957 FOR NEW SALMON NET FISHERMEN'S LICENSE: Although all salmon net fishermen in Alaska will be required to have a special commercial fishing license for the coming season, the prescribed fee of \$5 for the license will not be charged in 1957, Assistant Secretary of the Interior Ross L. Leffler announced on April 11.

The new regulatory provision, the proposal of which was published in the Federal Register on March 6, 1957, separates the registration of boats and gear from the registration of fishermen. With the exception of gill nets in Bristol Bay and Cook Inlet, under this new Federal license a fishermen will not have to report a change from one boat to another or from one form of gear to another so long as he remains in the area for which he was licensed.

The license is required only of salmon net fishermen and not of trollers. This special Federal license will be necessary in addition to any license required by the Territory of Alaska.

Announcement was scheduled to be made soon by the Service in Alaska of public places where the license may be obtained.



California

LANDINGS, 1956: Landings of fish and shellfish at California ports in 1956 amounted to 663 million pounds (exclusive of imports), an increase of 64.9 million pounds over the 598.1 million pounds landed in 1955. In 1956 landings of Pacific and jack mackerel increased about 100 million pounds as compared with 1955. Lesser increases were made in 1956 in the landings of anchovies and tuna. The catch of California sardines declined sharply (55 percent) from the 144.9 million pounds landed in 1955.

San Pedro lead all other California ports with total landings of 383 million pounds, followed by San Diego with 135.3 million pounds; Monterey, 46.3 million pounds; Santa Barbara, 41.4 million pounds; Eureka, 31.6 million pounds; and San Francisco, 25.5 million pounds.

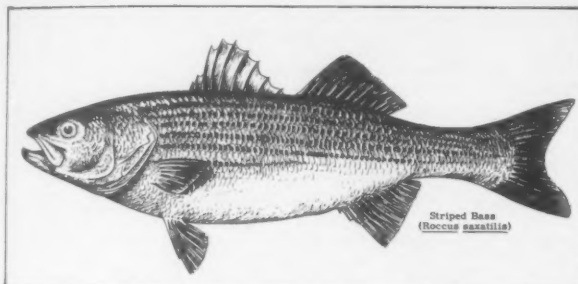
Tuna receipts by California canneries of 204,800 tons

California Domestic Caught Landings of Major Species, 1955-56			
Species	1956	1955	Percentage Increase or Decrease from 1955
	.(In 1,000 Lbs.).		%
Anchovies	53,945	42,440	+ 27
Jack mackerel	83,504	34,514	+142
Pacific mackerel	71,630	20,608	+248
Sardines	65,306	144,916	- 55
Tuna:			
Albacore	34,998	24,466	+ 43
Bluefin	12,558	13,170	- 3
Skipjack	118,246	95,838	+ 23
Yellowfin	153,878	112,740	+ 36
Total for Major Species	594,065	488,692	+ 22

(domestic landings and imports) and the canned tuna pack of 9.5 million standard cases set new records in 1956. The previous record tuna pack of 9.3 million cases was set in 1954. During the past ten years the California tuna pack has increased steadily from 4.5 million cases in 1946 to the record pack of 1956.

SALMON AND STRIPED BASS GILL-NET RECOMMENDATIONS FOR SACRAMENTO RIVER: Three recommendations for minimizing striped bass destruction by commercial netters and materially increasing escapement of spawning salmon from nets in the Sacramento River were offered in a March 29 report of the California Department of Fish and Game.

At the same time the Department warned that emergency legislative action, as well as further restrictions by the Fish and Game Commission on sports fishermen, may be necessary in 1958 if the numbers of salmon spawners in the Sacramento does not approach ideal levels this fall.



The recommendations are contained in a study of commercial salmon and shad netting operations in the Sacramento River covering a two-year period.

The recommendations and the warning (a fourth "conditional" recommendation) are as follows:

- "1. Eliminate gill nets from Grizzly and Honker Bay flats to effect maximum preservation of striped bass.
- "2. Develop methods and gear for taking salmon and shad commercially which will not destroy striped bass.
- "3. Eliminate all gill-netting in the river, except for spring shad and salmon seasons, adjusted to April 15 through May 31, and except for fall salmon season adjusted to August 10 through September 5 and September 20 through September 30. Weekend closures should be continued.
- "4. If effective salmon spawning does not approach the level of 400,000 to 500,000 spawners in the fall of 1957, reduction of both commercial and sports salmon take in the ocean and further curtailment in the river should be effected by emergency action of the legislature in 1958 and by the Fish and Game Commission on sports fishing. If recovery of the salmon fishery isn't indicated in the 1958 fall salmon spawning run, still more drastic restrictions should be imposed on all segments of the fishery to preserve the species."

In the 33-page report, complete with statistical evidence supporting each finding and recommendation, the Department listed the problems of the Sacramento River migratory fisheries, summarized the facts relating to these fisheries (salmon and striped bass), drew conclusions, listed recommendations and alternate proposals, and summarized the reasons for the recommendations. The report and recommendations supersede and replace a preliminary report of the same studies issued in August, 1956. New material, not available in August, is contained in the new report and considered in the recommendations.

In order, the Department declared these are the problems of the fisheries:

1. While sports and commercial catches of salmon hit record highs, the 1956 spawning count dropped from a four-year average of about 500,000 fish to about 200,000.
2. Sacramento River and Delta striped bass are gradually declining in numbers while the sports fishing pressure increases.
3. The commercial shad gill-net catch has averaged about 670,000 pounds annually since 1945 and there appears to be a continuing abundance of this fish. . . but the present commercial methods of taking salmon and shad has a deleterious effect on striped bass.
4. Traditional conflict of interest between sportsmen and commercial gill-netters has intensified as a result of the declining numbers of stripers and spawning salmon passing upriver.

The Department says its records reveal that it requires between 400,000 and 500,000 spawners in the Sacramento River to sustain the California salmon fishery at a high level. The spawning count last year dropped under 200,000 fish and the Director warned in February that curtailment of fishing activity would be necessary if the 1957 fall count showed no substantial improvement.

Ocean and river salmon fisheries depend almost entirely on the same Sacramento River spawned fish. Since 1951, sports ocean trolling catches have increased annually from 100,000 to 200,000 fish while the commercial ocean troll fleet has increased its catch in the same period from 416,000 to 800,000 fish annually.

The Department's report says the commercial river gill-net fishery has averaged 60,000 fish annually for five years, but from 1954 to 1955 the river salmon gill-net take jumped 2.5 times to 200,000 fish. Sports salmon take in the river is estimated at 20,000 fish a year.

Most of the commercial river catch of salmon--97 percent--is taken during the August 10 to September 26 season, according to the Fish and Game report. Only 3 percent is taken during the winter and spring salmon gill-net season between November 15 and June 15.

The Department declared the destruction of striped bass by commercial fishermen netting salmon and shad is quite substantial. In 1955, the fall salmon gill nets, which took about 118,000 salmon (2,274,000 pounds) killed about 8,300 striped bass weighing 132,000 pounds.

In 1956, the spring shad gill nets took 430,372 pounds of shad and killed 13,500 striped bass weighing 117,000 pounds in doing it. Most of the striped bass were killed by nets placed in Grizzly and Honker Bay Flats. In these areas netters took their smallest amount of shad (only 81,097 pounds), but killed the most stripers--76,500 pounds.

The report declares the take of shad and salmon would not be severely curtailed by closing the flats. The flats produced about 20 percent of the total shad catch and 12 percent of the total fall river salmon catch. During the spring, there is sufficient open river area to accommodate the 15 boats of the 59-boat fleet which now fish for shad in the flats, the report said. Mortality of bass in shad gill nets on the flats is high, the Department claims, because nets go unchecked for from 12 to 24 hours. Mortality of bass would be reduced if nets were checked often and regularly to remove entrapped stripers, according to the report, which recommends that if the flats are not closed any nets used therein should be continually attached to a boat. The Department believes this would result in periodic checkups of the nets and a reduction in the number of striped bass killed.

The Department's report proposes that some form of pound-net or trap, which will catch shad and salmon economically without destroying striped bass, be substituted for gill nets. It believes it should be possible to develop such gear within three years.

The report recommends curtailing of both commercial shad and salmon seasons to reduce striped bass mortality and to enable more salmon to escape upstream to spawn. The Department admits the proposal to drop the first 10 days of the existing shad season would reduce the catch by about 6 percent, but also declares it can be made up during the remainder of the season. A two-week break (September 5-20) in the fall salmon season would permit a substantial part of the main run of Sacramento River fish to pass upstream, thus strengthening the most important segment of the resource, according to the Department. The report says the winter-spring salmon season (November 15-June 15) accounts for only 3 percent of the total river salmon catch, but believes there is a relatively large loss of striped bass to the nets during the same time.

In regard to its warning about the condition of the salmon fishery, the Department said the fishery will be in critical trouble if a second consecutive bad spawning year is recorded in the fall of 1957. Immediate protective action by the Legislature and the Commission will be necessary to protect the potential 1958 spawning class, prior to the 1958 season, the report said. The salmon fishery is based on a four-year life cycle of the fish.



Cans--Shipments for Fishery Products, January 1957



Total shipments of metal cans for fish and sea food during January 1957 amounted to 6,900 short tons of steel (based on the amount of steel consumed in the manufacture of cans), compared to 4,842 short tons in January 1956. Fish canning in January 1957 was largely confined to tuna and oysters.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23,0 base boxes of steel equal one short ton of steel.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, MARCH 1957: Fresh and Frozen Fishery Products: A total of 1,640,000 pounds (valued at \$885,000) of fresh and frozen fishery products for the use of the Armed Forces were purchased in March 1957 by the Military Subsistence Market Centers. This was a decrease of 2.3 per-

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, January-March 1957 with Comparisons

QUANTITY				VALUE			
March		Jan.-Mar.		March		Jan.-Mar.	
1957	1956	1957	1956	1957	1956	1957	1956
(1,000 Lbs.)				(\$1,000)			
1,640	2,198	5,530	4,943	885	1,106	2,862	2,702

cent in quantity, but the value was higher by 9.5 percent as compared with the previous month. For the first 3 months of 1957 purchases totaled 5,530,000 pounds, valued at \$2,862,000--an increase of 11.9 percent in quantity and 5.9 percent in value as compared with the similar period in 1956. (Data are not strictly comparable due to a change in method of reporting. Comparisons on a 3-month basis are less subject to error than are monthly comparisons.)

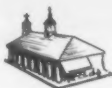
Average prices paid for fresh and frozen fishery products in March 1957 averaged 54.0 cents a pound, higher than the 48.2 cents paid the previous month, and the 50.3 cents paid in the same month of 1956.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during March 1957. During the first three months of 1957, purchases of canned tuna, salmon, and sardines were lower by about 7.4 percent as compared with the similar period in 1956.

Note: In addition to the purchases of fresh and frozen fishery products reported, some local purchases are made which are not included. Therefore, actual purchases are higher than reported.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, January-March 1957 with Comparisons

Canned Product	Quantity			
	March		Jan.-Mar.	
	1957	1956 ^{1/}	1957	1956
	(1,000 Lbs.)			
Tuna	573	-	841	1,396
Salmon . .	-	-	992	601
Sardines . .	8	-	19	8
Total . .	581	-	1,852	2,005
^{1/} Unavailable.				



Gray Whale Herd Moves North to Bering Sea

The gray whale in the Pacific is now heading north to its summer feeding grounds in the Bering Sea in a migration that will get little public observation. This whale, a scenic attraction on its journey south close to shore during the winter months, makes its northward migration virtually unnoticed--the thousands of migrants being spread over too wide an area in the Pacific and usually too far from shore to attract attention. On its way southward it travels in a relatively narrow corridor seldom more than three miles from shore.

California Gray Whale
(*Rhachianectes glaucus*)



During the recent winter Fish and Wildlife observers at the La Jolla, Calif., station counted 1,782 of these animals migrating to their wintering grounds. In one period the whales were about five miles apart. Traveling at five miles an hour, that meant a whale an hour passed the observers.

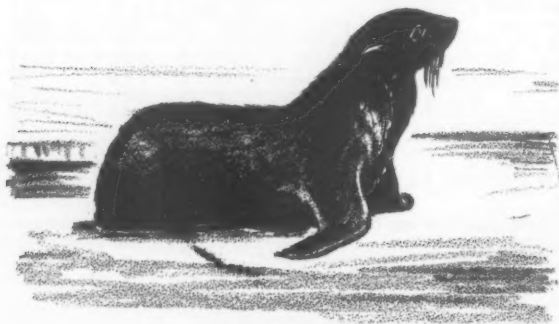
Their wintering ground is along the Coast of Lower California, and some of the whales even round the tip of the long peninsula and feed not far from the main coast of Mexico.

Once plentiful, the gray whale was harvested to the point of near extinction. Now it is protected by international agreement. Presently it is estimated there are about 4,000 adult gray whales and 500 calves, although conditions make an accurate census difficult.



Fur-Seal Skins

PRICES DROP AT GOVERNMENT SPRING AUCTION: A decrease in prices of United States fur-seal skins marked the semiannual auction of Government-owned furs at St. Louis on April 12. The sale was well attended by United States, Canadian, and European buyers.



Alaska Fur-Seal.

A total of 27,819 skins, products of the sealing industry administered by the United States Fish and Wildlife Service on the Pribilof Islands, brought \$2,547,182. This compares with 26,890 skins sold for \$2,714,852 at the October 1956 sale. The grand average for all skins sold for the account of the United States Government was \$91.56; at the October sale it was \$100.96. The grand average at the April 1956 sale was \$93.27.

Of the Alaska skins, 11,663 were dyed "Matara" (brown), 426 were "Safari" brown (a lighter brown), 10,154 were blacks, and 5,576 "Kitovi"-processed skins were offered for the first time. Kitovi has been characterized as "an exciting new shade of midnight gray with highlights of silver and an intriguing blue cast." It is the first new shade to be offered since Matara was introduced in 1939.

The Kitovi skins brought an average of \$119.38. Matara skins sold for an average of \$81.91, a decrease of 18.3 percent under the October auction. Safari skins brought an average of \$68.97, a decrease of 10.4 percent. The black skins averaged \$88.32, a downward change of 20.1 percent as compared to the October sale price of \$109.38.

At the April sale, 117 dressed sea otter skins were sold for the account of the United States Government. These skins brought a total of \$2,677.

These sea otter pelts were accumulated as a result of salvage and other activities by the Fish and Wildlife Service on Amchitka Island, Alaska, in the Aleutian Islands National Wildlife Refuge, over the past several years. Interested bidders were advised that the Government is not considering lifting the present prohibition against the taking of sea otters.

In addition to the United States skins, 3,453 South Africa fur-seal skins were sold for the account of the Government of the Union of South Africa at an average of \$36.35, a decrease of 0.6 percent from the last sale, and 350 Uruguay fur-seal skins were sold for the Government of Uruguay at an average of \$31.04. The October 1956 average was \$48.78.

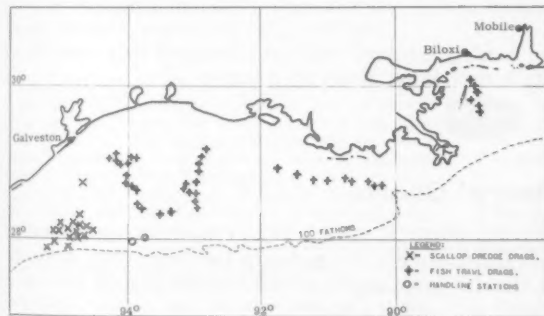
The next auction is tentatively scheduled for October 18, 1957, in St. Louis.

Note: Also see Commercial Fisheries Review, November 1956, p. 37.



Gulf Exploratory Fishery Program

EXPLORATORY FISHING FOR SCALLOPS AND RED SNAPPER OFF TEXAS AND LOUISIANA COASTS (M/V Oregon Cruise 44): In an attempt to locate unexploited commercial stocks of scallops and red snapper in the Gulf of Mexico off the coasts of Louisiana and Texas, the Service's exploratory fishing vessel Oregon tested New England-type bottom fishing gear. Results from the experimental fishing from March 5 to 21 were poor.



M/V Oregon Cruise 44, March 5-21, 1957.

Scallop dragging, using a New England-type 8-foot scallop dredge, was carried out in an area extending from Chandeleur Island to Galveston in depths of 5 to 34 fathoms. Major attention was given to areas of predominantly sand bottom. A total of 44 one-hour drags yielded no living scallops, although large quantities of dead scallop shell (*Pecten gibbus*) were found in many areas.

March 13 through 17 was spent trawling off Galveston, using a New England-style otter trawl, in depths of 11 to 53 fathoms. The primary objective of this work was to trawl for red snapper in the area known as "Little Campeche." Strong winds and heavy seas during March 14-17 greatly hampered fishing operations and results were very poor. The best drag caught 118 pounds of red snapper, averaging about 1½ to 2 pounds each. All catches were small, with porgies and croakers making up the bulk of the catch.

On March 13, approximately 30 miles south of Galveston, extensive schools of fish were observed during the late morning and early afternoon. Visual identifica-

tions were impossible but a short drag, using a large-mesh otter trawl, through one of the schools caught about 200 4- to 5-inch anchovies (Anchoa hepsetus).



Maine Sardines

NEW-QUALITY CONTROL AND RESEARCH LABORATORY OPENED: The formal opening of the Maine sardine industry's new and modern research and quality control laboratory at Bangor, Me., took place April 11. The new laboratory occupies a four-story building on Bangor's Exchange Street and will be fully equipped to handle a number of the industry's State tax-financed development program projects including grading, technological and biological research, new products, and quality control activities. Previously the industry had maintained research and grading facilities at the University of Maine.

* * * * *

SEASON LEGALLY OPENED APRIL 15: The 1957 Maine sardine canning season legally opened on April 15, but none of the 38 plants along the coast were in operation due to the lack of fish.

The Executive Secretary of the Maine Sardine Industry said that although fish could strike anytime, veteran canners did not predict any sizable production until late in May.

The prediction is based on the failure of a sizable early spring run of fish appearing during the past 10 years.

Canners held normal inventories from last year's pack of 2,250,000 cases, but these stocks should be well sold out by June 1, when heavy production usually gets under way.

Added emphasis on research and quality control will be stressed this season as a result of the opening of the industry's new laboratory in Bangor.



Mariners' Charts

COAST AND GEODETIC SURVEY TO CHECK DATA FOR CHARTS: A converted B-17 with cameras in its belly left Baltimore's Friendship International Airport early in April on a mission that will take it over much of the United States and as far as the Aleutian Islands.

On the mission, which may last through November, a party from the Coast and Geodetic Survey, Department of Commerce, will take aerial photographs of coastal lands to be used in compiling nautical charts.

The airplane and flight crew are supplied by the U. S. Coast Guard, Treasury Department, under a cooperative arrangement. The Coast and Geodetic Survey sends a photographic navigator, a photographer, and the cameras. When pictures are being made, the photographic navigator guides the plane with a Norden bomb-sight.

The principal camera is a giant nine-lens machine developed by the Coast and Geodetic Survey, which in one snap at 22,000 feet can picture 300 square miles.

It weighs almost 500 pounds and is moved around on a wheeled dolly until it is lifted into the B-17 by a crane.

The big camera is especially valuable in mapping inaccessible areas, to which it would be very costly to send ground parties of surveyors. On the present mission, pictures will be taken first along the Gulf Coast. By May 15, the mission was scheduled to arrive in the Aleutians. Here it will work between Adak Island, in the central Aleutians, and the Alaska mainland. The uncertain weather in the Aleutians makes exact scheduling impossible, but the mission will probably return to the United States early in July and set out for Alaska again in mid-August. In all, the B-17 may fly 75,000 miles.

Prints from the nine-lens aerial negatives are made in a special transforming printer that combines the nine separate views into one composite photograph about 35 inches square.

The single-lens camera that will be part of the mission's equipment shoots an area of four square miles at 7,000 feet. It is equipped to take infrared photographs, which are effective in showing shoal areas.

The Coast and Geodetic Survey publishes charts for the country's mariners and aviators. In its geodetic work it determines the basic points on which all American boundaries depend.

Most of the Survey's fleet also left various ports early in April for summer assignments along the country's coasts.

Shorelines change over the years, shoals develop, and recent wrecks threaten navigation. These changes, as well as new lights and buoys, must be noted on the Survey's charts as they are published.

Although the Survey has mapped more than 100,000 linear miles of coast since it was founded in 1807, some of the areas to be surveyed this summer in Alaska have never been charted in detail.

Norfolk, Va.: The Cowie has been assigned to Chesapeake Bay, and will survey from Pocomoke Bay southerly along the Eastern Shore and to mid-bay offshore. The Gilbert will survey the area along the easterly and southerly side of Nantucket Island, Mass. The Hydrographer, will go to Georges Bank in the Gulf of Maine for a complete resurvey, the first to be made of this important fishing area in 25 years.

The Hilgard and Wainwright, also at Norfolk, have been assigned to do "wire drag" operations near Swan Island, Me. A wire drag is a metal cable that, when pulled through the water at a predetermined depth by two vessels, detects uncharted rocks or wrecks that may be hazards.

Punta Gorda, Fla.: The Sosbee will continue the survey of Tampa Bay, which is to be completed within two years.

Tampa, Fla.: The Scott will make an inspection of the east coast in preparation for revision of the Coast Pilots. Coast Pilots are books that contain detailed information for which there is no room on the charts.

Honolulu, T. H.: The Pioneer is now making offshore surveys in the Hawaiian Islands.

Seattle, Wash.: The Lester Jones and the Hodgson will work in southeast Alaska. The Patton will make a hydrographic survey of the area north of the San Juan Archipelago in Haro Strait, Washington State.

Three other ships will leave Seattle April 15 for Alaska. One of them, the Explorer, will survey the area between Great Sitkin Island and Kasatochi Island in the Aleutians. She will also move easterly along the south side of Atka Island. Her sister ship, the Pathfinder, will concentrate on Patton Bay, Montague Island, Bechevin Bay, and Port Heiden along the north shore of the Alaska Peninsula. The third is the Bowie which will go to Prince William Sound and chart the area south of Chenega Island, including Nassau Fjord, Icy Bay, and Bainbridge Passage.

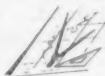
Coast and Geodetic Survey ships may be distinguished by the Bureau's service flag, which has a blue field carrying a white circle in which there is a red triangle. The vessels are all painted battleship gray. Each carries the name, but no number. The uniforms of officers and crew resemble those of the Navy and Coast Guard, but with Survey insignia.

The four largest of the Survey ships are the Pathfinder, Explorer, Pioneer, and Hydrographer.

varying in size from 1,000 to 2,600 tons. A new modern ship is on the drawing boards.

The operations of the Survey fleet appear mysterious to some observers. The ships may be sending out boat parties, or pulling underwater wire drags, but sometimes there are no visible activities. An officer may be seen on deck taking

a "sextant fix" to determine the ship's exact location. But more often this is done by electronic instruments, such as Shoran and the Electronic Position Indicator, which was developed by the Survey. Depth is determined by the "Fathometer," an electronic device that accurately measures the time it takes a sound wave to travel to the bottom and return as an echo.



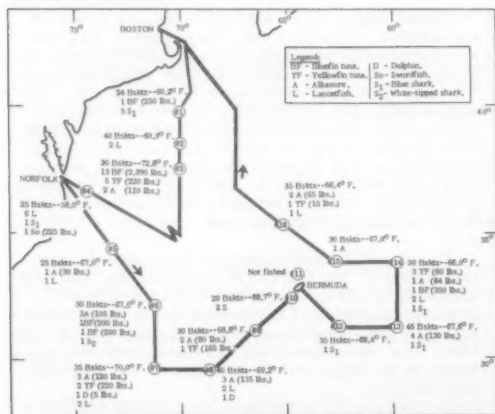
North Atlantic Fisheries Exploration and Gear Research

EXCELLENT CATCH OF TUNA MADE SOUTH OF NANTUCKET (M/V Delaware Cruise 57-3): An excellent catch of tuna was made by the Service's exploratory fishing vessel Delaware with long-line gear south of Nantucket in the Gulf Stream during the recent four-week cruise (March 15 to April 12). The cruise, the first of its type, to explore the offshore Western Atlantic for possible latent fishery resources, has contributed to the knowledge of the Atlantic tunas as northern distribution records were noted for two of the tuna species--albacore (*Thunnus alalunga*) and yellowfin (*Thunnus albacares*)--for this season of the year.

The fishing gear used in this survey was all-nylon long-line gear of a type developed by the Service for use in the Gulf of Mexico. Each 10-hook section or "basket" of gear is 828 feet long, suspended in the water with buoys with lines of 10 or 15 fathoms in length. Hooks were baited with sea herring (*Clupea harengus*), alewives (*Pomolobus pseudoharengus*), and bluebacks (*Pomolobus aestivalis*).



The Service's research vessel, M/V Delaware.



M/V Delaware Cruise 57-3, March 15 to April 12, 1957.

First indications that bluefin (*Thunnus thynnus*) of a large size were to be found in the northern waters of the Western Atlantic during the winter season was during the first 24 basket set 60 miles SW. by S. of Nantucket Lightship, over the edge of the Continental Shelf. One 250-pound bluefin tuna and several blue sharks were caught at this station.

Station 3, located in the warmer waters of the Gulf Stream, yielded 3,320 pounds of tuna on a 29-basket set, with a catch rate of 7.1 fish per 100 hooks. Thirty baskets were set but one basket, heavy with fish, was lost due to parting of the mainline in rough seas. The catch consisted of 13 bluefin (average 230 pounds each), 5 yellowfin (1--50 pounds, 4--15-20 pounds), and 2 albacore (55 pounds each).

Stormy seas halted all fishing and after resumption of fishing operations in more southern waters, albacore were taken at almost every station with occasional catches of yellowfin and bluefin (see chart). Very rough seas prevented additional fishing near the Gulf Stream on the north leg of the cruise.

Surface temperature, bathythermograph casts, and night-light collections were made at all stations in cooperation with the Woods Hole Oceanographic Institution. Technological samples for freezing tests, morphometric measurements, and stomach content samples were also taken.

The Delaware was scheduled to leave on April 23 for three weeks of scallop exploratory fishing and gear performance tests, using conventional and modified 11-foot New Bedford scallop dredges, in the Georges Bank area. Technological problems in freezing scallops at sea were to be investigated utilizing the equipment now installed aboard the vessel.



North Atlantic Fisheries Investigations

TAGGING CRUISE BY M/V "ALBATROSS III" (Cruise 89): To test the efficacy of various tag combinations for haddock, to tag cod, and to make kinescope recordings of groundfish behavior with underwater television were the objectives of the Service's research vessel Albatross III during this cruise (March 21-April 5, 1957).

Tagging was conducted on Georges Bank mostly east of 67° and north of $41^{\circ}40'$; Browns Bank west of $65^{\circ}50'$ and north of $42^{\circ}41'$. A total of 72 tows of 20 to 60 minutes duration were made in depths ranging between 24 and 56 fathoms. A standard #41 otter trawl with cod ends of $3\frac{1}{4}$ -inch double manila and $4\frac{1}{2}$ -inch dacron with a cover was used. Various combinations of tags were experimented with: Peterson Gill vs. plastic "spaghetti" dorsal loop; Peterson Gill vs. Peterson Gill with a "spaghetti" loop on gill cover; Peterson dorsal fastened with stainless steel wire; combination Lea Hydrostatic with internal anchor. A total of 2,117 haddock, 585 cod, and 80 halibut were tagged.

The television camera was rigged in a $7\frac{1}{2}$ -inch cod end looking aft. Two 1,000-watt underwater lights were attached just forward of the camera housing. The behavior (including escapement) of haddock was televised and recorded in the vicinity of Cape Cod on Stellwagen Bank, and about 5 miles off Nauset Beach.



North Pacific Exploratory Fishery Program

MIDWATER TRAWL RESEARCH (M/V John N. Cobb Cruise 30): (1) Obtaining information on the performance of a 64-foot nylon midwater trawl and the acoustic depth telemeter, (2) perfecting midwater trawl handling techniques, and (3) search for fish at midwater depths were the principal objectives of a five-week cruise by the Service's exploratory fishing vessel John N. Cobb. The first two weeks were spent in the inside waters adjacent to the San Juan Islands. The mesh sizes of the new midwater trawl net range from 5-inch stretched mesh in the wings to 3-inch stretched mesh in the cod end. A liner of $1\frac{1}{4}$ -inch stretched mesh was inserted in the cod end to sample species of small fish such as herring.

After completion of gear testing, the vessel returned to Seattle for installation of a "Sea Scanar" recorder and minor modifications of the midwater trawl gear prior to heading for the waters off the Washington coast on March 25 to search for fish at midwater depths.

Considerable sounding with the recording "Sea Scanar" and a recording depth sounder off the Washington coast from Swiftsure Lightship to off the Quillayute Riv-



Fig. 1 - Setting nylon mid-water trawl net from the M/V John N. Cobb in the Straits of Georgia.

er at distances up to 40 miles offshore revealed only a few small and widely-separated schools of fish in midwater. Because of these conditions actual fishing operations with the midwater trawl were limited to four tows which were made to verify the identification of fish on the recorder tracings. Catches were small, with the best tow yielding 12 pounds of black rockfish, 6 pounds of herring, and 8 pounds of smelt. The "Sea Scanar" recorder and the depth telemeter worked satisfactorily.

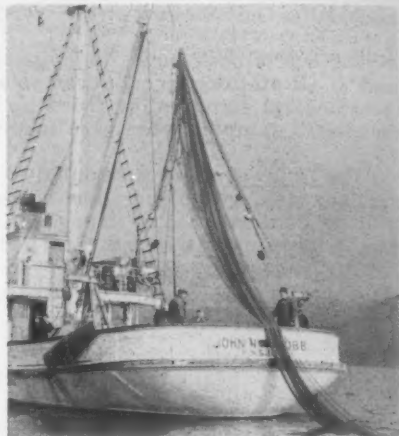


Fig. 2 - Picking up mid-water trawl aboard the M/V John N. Cobb.

This was the first in a series of midwater trawling cruises scheduled during 1957 to determine the practicability of a commercial midwater fishery for such food



Fig. 3 - Floater of fish caught at mid-depths by the M/V John N. Cobb's mid-water trawl off the Coast of Washington in June 1956. Mostly hake were caught.



Fig. 4 - Emptying another cod end full of fish caught at mid-depths by the M/V John N. Cobb's mid-water trawl off the Washington coast in June 1956. Catch was mostly hake.

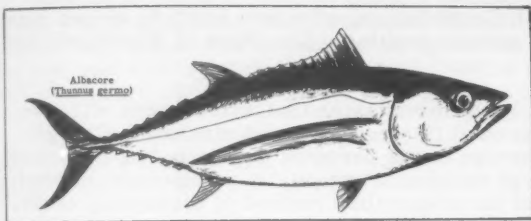
fishes as Pacific ocean perch, cod, and other species which are known to spend at least part of their time off the bottom. The cruise was originally scheduled to last seven weeks, but because of the necessity for emergency repairs to the main engine of the John N. Cobb, it was terminated one week ahead of schedule and the vessel returned to port on April 5.



Oregon

ALBACORE TUNA LANDINGS, 1956: The return of albacore tuna in commercial quantities to waters off the Oregon coast in 1956 after an absence of four years resulted in landings of 3.5 million pounds of this species at Oregon ports, according to the Oregon Fish Commission (December 31, 1956).

Presence of albacore in offshore waters of the Northwest in 1956 was first confirmed by scattered catches of albacore by two research vessels, the John N. Cobb



of the U. S. Fish and Wildlife Service and the Brown Bear of the University of Washington Department of Oceanography. The vessels were participating in an extensive search for tuna and were studying conditions that could possibly explain the sporadic appearance of albacore in the northeast Pacific Ocean.

Stimulated by the research vessel catches, commercial vessels joined in the search for fishable concentrations of albacore and in late August schools of albacore were located about 70 miles off Newport, Ore.

Heavy catches continued through September until a drop in price caused many boats to abandon albacore fishing. By early October, landings of locally-caught fish tapered off and the bonanza was over--at least for 1956.

The good albacore run in 1956 was no accident--daily catches per boat were higher than in 1944 when a peak catch of 22.5 million pounds was landed in the State. Had the fish appeared in July, as they formerly did, and had the market remained good throughout fall months, the 1956 catch might have been comparable to previous good years.

Whether or not albacore will return to Oregon offshore waters in 1957 is a question. Fisheries scientists who have worked on the mystery are reluctant to give explanations of the albacore's movements. There is some evidence that water temperature has an influence on albacore migration.

Some fishermen had predicted the return of albacore early last summer after observing an abundance of albacore food--principally small bait fishes--in the Northeast Pacific Ocean waters. This factor may also have a definite bearing on the appearance of albacore off the Oregon-Washington coast.

COMMERCIAL FISHING REGULATIONS REVISED: The Fish Commission of Oregon announced early in April 1957 that it has adopted more stringent regulations governing commercial trolling for salmon in State waters.

Effective April 5, use of sport gear (hook and line, rod and line, reel, or any combination thereof used in angling) for commercial fishing under provisions of an Oregon troll license is prohibited and declared unlawful. Further, possession or custody of such gear aboard any boat or vessel used or engaged in trolling under the troll license or while en route to or from fishing in waters of State jurisdiction is likewise prohibited.

The State Fisheries Director stated that the new orders have been enacted to curb the activities of individuals who have been using commercial troll licenses to exceed established angling bag limits on salmon in coastal waters. He also stated that there is no intent on the part of the Commission to interfere with bona fide commercial salmon trolling by adoption of the new rules.

The revised regulation also states that there is no intent to prohibit boats or vessels normally employed in trolling from being used for charter, hire, or use in guiding when such boats are not engaged in commercial trolling.

Another action of the Oregon Fish Commission, effective April 5, closes waters of the Columbia River to commercial salmon trolling. The State of Washington had previously taken such action.

Other regulations revised by the Fish Commission that will become effective April 5 pertain to shellfish and commercial fishing in coastal streams. Changes in shellfish regulations include elimination of the personal use daily bag limit of 60 crayfish per individual; an alteration of the closed period for commercial harvest of crayfish; and a clearer definition of the prescribed method of measuring crabs.

The crayfish limit was dropped because there was no apparent biological purpose for the restriction. The commercial closed season on crayfish will now extend from November 1 to March 31, to afford more protection for female crayfish while they are carrying eggs. Measurements of crabs are to be the shortest distance through the body from edge of shell to edge of shell, directly in front of the points or lateral spines.

The passage of an initiative measure prohibiting commercial fishing for salmon in coastal streams south of the Columbia River at the last general election necessitated revision of several regulations still applicable to the coastal streams. All references to lawful commercial salmon fishing in coastal streams have been removed from the old regulations. Former provisions permitting lawful harvest of shad, striped bass, and miscellaneous other fishes, where applicable, have been re-enacted in the new order.

A continuous 30-day open season, November 1-30, for chum salmon in Tillamook Bay, as authorized in the coastal closure initiative, is also incorporated in the revised coastal order.

NEW HATCHERY FISH DIET USES UNUTILIZED MARINE FISH: Credit for developing a new hatchery fish diet using unutilized marine fish is shared jointly by the Oregon Fish Commission hatchery biology section and the Oregon State College Seafoods Laboratory at Astoria. The Seafoods Laboratory staff is searching for new uses of Oregon marine fishes not now being utilized. Fish hatchery diets offer a great potential. Some two million pounds of fish food are required annually for operation of Commission hatcheries alone.

It is planned to test the new diet on a hatcherywide basis at the Klaskanine Hatchery near Astoria. Results of this experiment will help to determine whether or not the new diet will be adopted for use at all 15 Commission salmon hatcheries.

Second phase testing of the experimental production diet for hatchery salmon was initiated the latter part of March at the Oregon Fish Commission's Sandy hatchery with the release of 32,000 "marked" silver salmon fingerlings into the Sandy River.

Prior to release, 16,000 of the young fish that had been fed a normal hatchery diet for almost a year were "marked" by excision of the adipose fin and a portion of

the left maxillary or upper jaw bone. The other 16,000 fingerlings had received the newly-developed experimental diet and were distinguished from the normal-diet fish by an adipose-right maxillary mark.

This phase of the testing is being conducted to determine if the experimental diet has any delayed influence on the survival of hatchery fish after they are liberated. The fish released won't be expected back to the Sandy River as adults until late 1958. Jacks will be due back this fall.

Results of the preceding 12-months feeding trial comparing the experimental production diet with the standard Sandy Hatchery diet indicate the new diet could cut fish food costs considerably at Oregon Fish Commission hatcheries. But before the new cost-cutting diet can be put into use at all Fish Commission hatcheries, it will have to undergo larger-scale testing, according to the State Fisheries Director.

The experimental diet being tested is fed in pellet form and is composed of 45 percent fish products and 55 percent meal consisting of a variety of components. Each component in the diet has been tested previously for fish-growing qualities.



Pacific Oceanic Fishery Investigations

ABUNDANCE OF SURFACE SCHOOLS OF TUNA BY LIVE-BAIT FISHING STUDIED (M/V Charles H. Gilbert Cruise 32): The abundance and distribution of surface schools of yellowfin and skipjack tuna by live-bait fishing and the availability of Marquesan sardines on the baiting grounds of all islands in the Marquesas group were studied by the Service's research vessel Charles H. Gilbert on a 70-day cruise (January 11-March 22, 1957). Abundant schools of skipjack or striped tuna (aku) and adequate supplies of live bait were reported found. The Marquesan area some 2,000 miles southeast of Hawaii is of interest as a potential new winter (Marquesan summer) fishing ground both for Hawaii-based boats and for the West Coast tuna fleet.



The Service's research vessel, Charles H. Gilbert.

In general, skipjack tuna (Katsuwonus pelamis) were very abundant around the Marquesas throughout the period of the cruise. Yellowfin tuna (Neothunnus macropterus) were not so abundant, however.

Two surveys were made of all the Marquesas Islands area during the cruise. On the first (January 25-31) the following tuna schools were sighted: skipjack, 40; yellowfin, 4; unidentified tuna, 32; mixed yellowfin and skipjack, 4; total schools sighted--80.

On the second survey (February 23-March 1), the following schools were sighted: skipjack, 21; yellowfin, 7; unidentified tuna, 61; mixed yellowfin and skipjack, 0; total schools sighted--89. (Unidentified schools are those where tuna are seen but not identified as to species.)

It is of interest to note that a similar survey made during August 1956 (Marquesas winter) resulted in the sighting of 33 schools.

In the Marquesas area, fishing trials were made with live bait on a total of 99 tuna schools. Fish from 36 of these schools responded to the point where a catch of

School Composition	Number of Trials	Catch of One or More Tuna (Schools)	Catch of 100 or More Tuna
Skipjack . . .	68	29	12
Yellowfin . .	18	2	0
Unidentified .	7	0	0
Mixed species	5	4	0
Little tuna . .	1	1	0
Total . .	99	36	12

one or more fish was made; fish from 12 schools "bit well," and 100 or more fish were caught.

It will be noted from table 1 that only fish from skipjack schools can be considered to have "bitten well." Virtually all of the fish in schools identified as yellowfin

were large--from 50 to 100 pounds, and they did not respond favorably to the live bait. The majority of the skipjack caught weighed from 4 to 10 pounds, with fish from a few schools weighing 15-20 pounds each.

As might be expected, fish from the schools chummed exhibited variation in favorable response to live bait. In general, the schools encountered during the first part of the cruise did not respond well. The best catches were made during the last six fishing days (March 4-9), when catches of 100 or more skipjack were made from six of the 14 schools chummed.

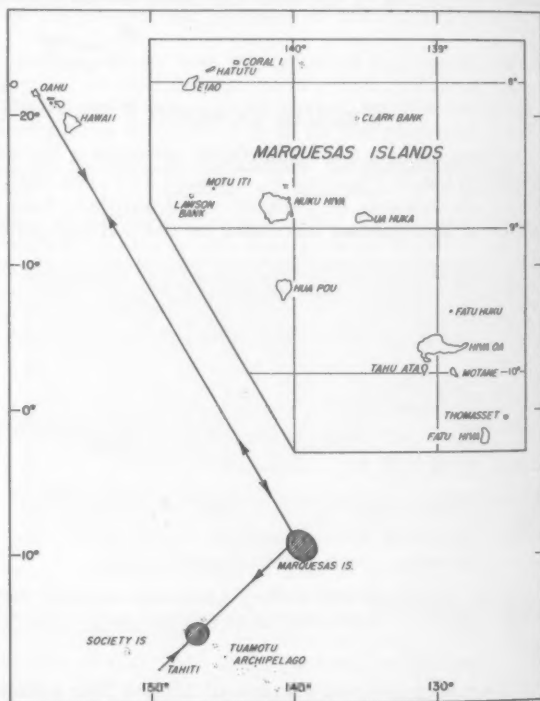
A total of 797 of the skipjack and 10 of the yellowfin tuna from the total catch of 4,838 skipjack and 53 yellowfin were tagged and released.

Two species of fish of a size suitable for live bait fishing were found in bays of the Marquesas Islands; the Marquesan sardine (*Haemulon vittata*) and weke (*Mulloidichthys* sp.). The sardines schooled well around the boat when thrown as live bait, but the weke tended to scatter and dive, proving unsuitable for tuna.

Surveys were made of 13 bays of the Marquesas Islands for sardines, and varying quantities were seen or caught in 10 of them. Most of the sardines were located over sandy bottom in sheltered bays (see table 2).

It was found that sardines of all sizes were attracted to a floodlight at night and on seven occasions successful sets were made with the night net alongside the vessel.

In all 1,678 buckets of sardines were caught in 59 day sets and seven night sets, each bucket containing an average of eight pounds of sardines. The sardines ranged from 3 to 5 inches in length, with most around 3½ inches.



Charles H. Gilbert Cruise 32 (January 11-March 22, 1957).

Sixty-four buckets of sardines (approximately 12,000 individuals) were released inside Pokai Bay, Oahu, on March 22, 1957, in an attempt at introduction of the species into Hawaiian waters.

Table 2 - Bait-Fish Productivity in Six Bays in Order of Decreasing Productivity

Locality	Remarks
1. Taio Hae Bay, Nuku Hiva I.	Most reliable bait source, 1,200 buckets seen, 1/24/57. Good protection from weather. Short tow to vessel.
2. Anaho Bay, Nuku Hiva I.	5,000 buckets seen, 1/31/57. Bad surge in NE. weather.
3. Taipi Vai, Nuku Hiva I.	100 buckets caught 2/4/57. Good protection from weather. Long tow to vessel.
4. Hakiheu, Nuku Hiva I.	130 buckets caught 3/5/57. Bad surge in NE. weather.
5. Taa Huku Bay, Hiva Oa I.	40 buckets caught, 1/27/57. None seen 2/27/57. Good protection from weather.
6. Hatiheu Bay, Nuku Hiva I.	50 buckets caught, 2/8/57. Bad surge in NE. weather.

Three days were spent in the Tuamotus in the vicinity of Ahi, Manihi, and Raihira atolls (table 3).

A new type of plastic dart tag was used to tag skipjack and yellowfin tuna on this cruise. The fish were released alive in the hope that subsequent recaptures may shed some

light on the migrations of these fish, at present almost completely unknown. The barbed head of the new tag is simply stabbed into the tissues of the fish, obviating the time-consuming knotting that was necessary with earlier types of plastic tags. Since tuna, and particularly skipjack, die very quickly out of the water, the speed and ease of attachment of the dart tag make it a very promising new tool for tuna research.

Table 3 - Tuna Schools in the Tuamotus

	Schools			
	Skipjack	Yellowfin	Mixed	Unidentified
	(Number of Fish)			
Sighted . .	5	1	2	21
Chummed . .	1	1	2	-
Catch . . .	237	17	-	-

ALBACORE TUNA PROGRAM: Studies of the albacore catch data gathered by the Service's Pacific Oceanic Fishery Investigations research and exploratory vessels were completed during the first quarter of this year. An estimate of the catch per unit of effort of subsurface albacore by long-line and the troll catch per unit of effort was made for various temperatures.

An estimate of the catch per unit of effort at various temperatures was obtained for both fall and winter long-line catches by first computing the hook depths from the results of sounding tube studies and then using these depths to estimate the temperatures from the on-station bathythermograms. The winter estimate showed a peaking of the catch at about 56° F. to 58° F. with the majority of the catch being made between 55° F. and 63° F. Although the data are few, all sizes of albacore were taken over approximately the same range of temperature. The fall temperature ranges were too broad to provide a reliable estimate, but there did appear to be a peaking at 56° F. or at about the same temperature noted for the winter catch.

A plot of the number of troll-caught albacore versus temperature gave an extreme range of 52° F. to 66° F. The plot gave a jagged curve with a dominant peak

extending from 59° F. to 60.5° F., with a smaller peak at 63° F. and a smaller well-separated peak at 52° F. A breakdown of the data as to season (summer and fall) and area (eastern and central Pacific) showed two paramount features. First, the central Pacific albacore have the over-all temperature range described above while the eastern Pacific albacore are restricted to the center of the temperature range. Second, the peak observed at 63° F. was associated with the fall catches in the eastern Pacific.

In the field of oceanography, the processing and analysis of data collected on past oceanographic and fishing cruises have continued. Two trial plots of the surface temperature from ships' weather reports were made for the July 11-20 periods of 1955 and 1956. These trials show that there are now adequate data available for the preparation of synoptic charts over the entire northeast Pacific. The coverage is adequate to permit annual and seasonal fluctuations to be traced and the position and extent of the temperature front (Polar Front) north of Hawaii and areas of upwelling off the West Coast to be described.

The Japanese have two albacore tuna-tagging programs under way. The Kanagawa Prefecture Fishery Experiment Station is sponsoring a tagging program in the long-line albacore fishery. During the past winter about 800 tagged fish were released in the Pacific and Indian Oceans by the commercial long-line vessels. The Nankai Regional Fisheries Research Laboratory is making preparations to tag about 1,500 albacore in the summer live-bait fishery off Japan.

Plans were completed for an intensive survey of a band approximately 350 miles wide off the West Coast between Point Arguello, Calif., and Destruction Island, Wash. The plan is to have 10 commercial vessels make an intensive trolling survey of the area while two POFI vessels patrol the area collecting biological and oceanographic data. The commercial vessels will be selected on a competitive bid basis.

BAITFISH STUDIES: As previously reported, on October 12, 1956, adult tilapia were placed in redwood tanks at the Service's Pacific Oceanic Fishery Investigations laboratory in Honolulu, the purpose being to examine this rearing method as a means of producing young fish for tuna bait. The first young were observed on December 20, 1956. Since that date one tank has been in continuous production, with 64 females producing 14,000 young in about 100 days. In a second tank with slightly different temperature and light conditions, relatively few (2,600) young were produced.

We have learned that young tilapia can be reared to optimum bait size (1½ to 2½ inches) for skipjack fishing in two months. We have also found that even the young fish are very cannibalistic, therefore the different size groups must be segregated.

A second meeting of the Baitfish Research Coordinating Committee was held and a plan adopted for POFI and Hawaiian Tuna Packers, Ltd. to collaborate in studying the production of bait-size tilapia in two large ponds near Honolulu. Intensive seining operations were carried out and large numbers of the adults in each pond were marked by fin clipping. The fish will be fed during the spring and summer and at regular intervals the ponds will be seined, the young fish removed for tuna bait, and from the recoveries of marked fish, the total population of the ponds will be estimated. From the information obtained by the end of the summer we will have a measure of the bait fish production from a known number of adult fish, with the feeding and harvesting costs; we can then evaluate this method of tilapia culture for producing bait fish. The bait produced will be used on POFI vessels and the commercial skipjack boats.

The largest introduction of Marquesan sardines to Hawaiian waters was effected in March when 12,000 were released along the south coast of Oahu. The fish were in fine condition. Within a week after the release two were taken by Oahu bait fishermen, one near Honolulu and the other on the north coast of the island.

BIG-EYED AND YELLOWFIN TUNA STUDIES: The big-eyed tuna catch data from the Hawaiian long-line fishery (1948 through 1955) were summarized and the analyses completed. The results gave firm evidence that the major part of the increase in big-eyed landings for the eight-year period under study was due to a shift in fishing grounds of the larger vessels from a general localized fishing effort around Oahu to an increased amount of effort being expended in the Hana, Maui, and Hilo, Hawaii, areas. These latter areas are considered to be good big-eyed fishing grounds.

The evidence supporting this conclusion is twofold. First, an analysis of the catch per unit of effort by size of vessel showed completely contrasting results. The big-eyed catch per trip of the smaller vessels (less than 45 feet registered length) was relatively constant over the entire period studied except for minor fluctuations. On the other hand, the catch per trip for the larger vessels showed a drastic increase from the 1948/49 season to the 1951/52 season with a relatively stable catch per trip thereafter. The second bit of evidence was obtained from a study of the area fished. The results showed that during the 1948/49 season only 44 percent of the total trips during the season were made into the Hilo-Hana areas. The effort into these areas increased during the subsequent years and leveled off during the last three years at about 90 percent.

A cursory study of the yellowfin catches showed a rather constant yellowfin catch per trip for the small vessels with the only noticeable drop occurring during 1955. Contrasted to this the catch per effort of the larger vessels was uniform only up through 1952 and dropped to a lower level thereafter. A general consensus shared by fishermen is that the windward sides of the islands are better big-eyed tuna grounds than the lee, whereas for the yellowfin the reverse is true. If this can be accepted (the data does show some confirmation), then it is possible to explain the drop in yellowfin catch rate to a lower level by the shift in effort discussed above. Essentially the fleet moved from the lee of Oahu to the windward side of the islands of Maui and Hawaii.

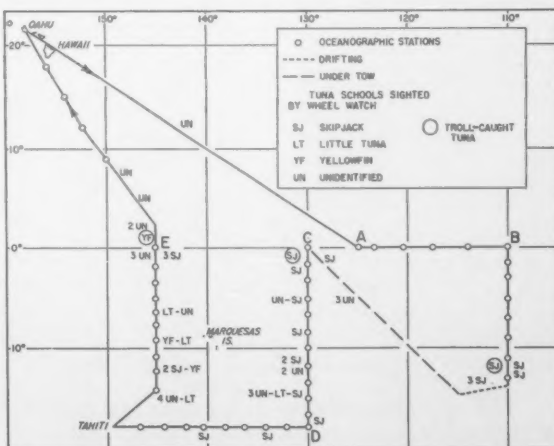
These results are particularly interesting because earlier investigators had attributed the marked changes in Hawaiian landings to changes in the distribution and/or abundance of the fish themselves.

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OCEANOGRAPHIC OBSERVATIONS ASSOCIATED WITH TUNA STUDIES IN CENTRAL PACIFIC

(M/V Hugh M. Smith Cruise 38): Scientific observations associated with studies of the tuna resources of the south central Pacific Ocean were completed on March 26 on an 11-week cruise by the Service's research vessel Hugh M. Smith. The vessel sailed 10,000 miles gathering detailed physical, chemical, and biological oceanographic information from an area covering more than 2 million square miles of ocean.

The primary mission of the vessel was determination of areas of high fishery potential, but an engine breakdown 3,600 miles



Hugh M. Smith Cruise 38 (January 11-March 26, 1957).

southeast of Hawaii provided an unusual opportunity to study in detail a feature of the oceanic circulation known as the Southeastern Pacific gyral.

During a 2-week drift covering almost 300 miles, daily hydrographic casts were made to 4,000-foot depths in order to gather water samples for chemical and temperature analysis. Movements of ocean currents can be determined by this technique. While drifting, the vessel crew improvised long-line fishing gear, which they launched daily in an effort to catch subsurface tunas.

Following engine repairs at sea with parts brought from Honolulu by the Coast Guard buoy tender Balsam, the Hugh M. Smith resumed her scheduled program. This included the use of radioactive carbon to determine the primary productivity of the marine algae upon which the ocean food chain depends, net hauls to capture small marine animals known as zooplankton, and special plankton hauls to secure fish larvae to provide data on the distribution of young tuna.

Some 2,400 miles southeast of Honolulu the vessel encountered large patches of yellow discolored water in an area about 10 miles in width. The patches were probably similar to the so-called "red tide," caused by a minute marine organism, which has occurred off California and Florida coasts. Samples of the discolored water were preserved for microscopic study at the Service's Honolulu Laboratory.

Other special water samples were taken just north of the equator at 145° W. longitude for a Norwegian marine biologist who is studying the phytoplankton (drifting marine algae) of the central Pacific.

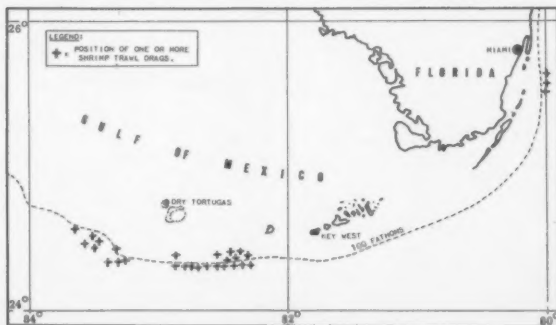
A total of 48 tuna schools were sighted about 1,800 miles south of Hawaii--19 of the schools were skipjack (aku), 4 were little tunny (kawakawa), 2 were yellowfin (ahi), and 23 were unidentified.



South Atlantic Exploratory Fishery Program

SOUTHEASTERN FLORIDA COAST DEEP-WATER SHRIMP SURVEY (M/V Combat Cruise 8): Deep-water shrimp trawling activities in March along the southeastern Florida coast from off Miami to Dry Tortugas by the U. S. Fish and Wildlife Service-chartered shrimp trawler Combat revealed no bottom where consistently

good catches of red shrimp (Hymenopenaeus robustus) could be made.



M/V Combat Cruise 8 (February 24-March 16, 1967).

Twenty-nine drags were made in the Key West-Dry Tortugas area in depths of 185 to 230 fathoms. Catch rates varied from 0 to 265 pounds of red shrimp per 3-hour drag. Various combinations of fishing gear were used, including 40-, 56-, and 100-foot flat trawls and an 80-foot balloon trawl. The 80- and 100-foot nets were fished with two warps, and the smaller nets were fished using a single warp and bridle.

The Combat attempted three drags east of Fowey Rocks Light (Miami). On two of these drags the gear became fouled and no catch was obtained. On the third drag the trawl, doors, bridle, and 100 fathoms of warp were lost when the trawl hit a bottom obstacle.

Considerable time was lost due to strong winds and mechanical difficulties.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1957:

Oyster Research: Two other companies have indicated interest in producing seed oysters for commercial export. Past experimental shipments indicated the possibility of exporting seed oysters from South Carolina to other waters, but final proof of the practicability would depend on successful export and successful growing of seed oysters on a much larger scale than our experimental plantings, Progress Report No. 31 (January-March 1957) of the Bears Bluff Laboratories points out.

Regular monthly studies on growth and mortality of individual oysters in trays at the Laboratory dock were begun again after a five-month recess due to a lack of personnel. Measurements and inspection of the individual oysters showed a 5.8-percent mortality of all oysters from July to January. Since January, the number of oysters dying has been very small and the percentage of mortality totaled only 1.4. Growth of oysters from January through the end of the first quarter has been about normal.

Shrimp Research: A total of 33 experimental drags off the southern part of South Carolina out to the 50-fathom curve were made during January, February, and March. Rock shrimp (*Sicyonia*) continued to be found in small amounts in from 20 to 40 fathoms of water. One trawl haul made in 20 fathoms at night on March 14 yielded 710 porgy in 30 minutes of dragging with a 20-foot net. However, all these fish were quite small, ranging from 5 to 6 inches only in length. Other fishes were not taken in commercial quantities.

In February the Laboratories' offshore research vessel served as a "quarter" boat for several days while shrimp fishing was carried on from an 18-foot launch in the shallow waters of Bull Bay. Trawling in Bull Bay yielded a few white shrimp (*Penaeus setiferus*), but only one spotted shrimp (*Penaeus duorarum*).

During the period covered by this report both research vessels kept tabs on the population of white shrimp which usually are found during the winter months from the beach out to about 4 fathoms. In January the relative abundance of white shrimp under the beach appeared to be slightly greater than usual for the past three years. Small white shrimp were also fairly numerous in this area in February but seemed appreciably less in March. No small white shrimp could be found more than three miles off the beach.

In late February and in March, exceptionally large concentrations of small white shrimp were located in the South Edisto River. These shrimp were concentrated in waters with a salinity range of from 14 to 18 p.p.t. In salinities below 14 p.p.t. the numbers diminished greatly. Similarly in waters above 18 p.p.t. the density of shrimp was markedly reduced. On March 2, the size of the majority of the shrimp was 130 count (heads off). By the third week in March the greater portion of the catch in this area had increased in weight so that the count now ran 80 shrimp to the pound (heads off). This represents a little better than a 38-percent increase in weight in three weeks. In the 4½ years that the Laboratories have been continually carrying out experimental trawling, this is the first time that such a large concentration of small white shrimp has been observed in inland waters during the winter months.

Pond Research: The fresh-water lake at Bears Bluff had dried up due to the long extended drought. The lake was re-established by pumping fresh water from a deep well.

During the period covered by this report, a 535-foot six-inch well was drilled in the yard of the Laboratories and a deep-well jet pump was installed. In January the Department of Public Works of Charleston County removed more than 7,500

cubic yards of material from the lake bed and rebuilt and strengthened the dam separating the lake from one of the salt-water experimental ponds. At the end of March, the deep well supply, augmented by rainfall, has resulted in the accumulation of over a million gallons of fresh water. Within a short time it will be possible to pump from the fresh-water lake and "irrigate" one of the salt-water ponds. Thus one one-acre salt-water pond can be kept at high salinity while in the other one-acre experimental pond the salinity can be lowered to almost any desired amount, and thus the influence of salinity both high and low, on shrimp, crab, fish, and oysters can be studied without fear of interruption from further drought. The salinity conditions found in low country creeks and rivers in periods of heavy rainfall or drought can be simulated.

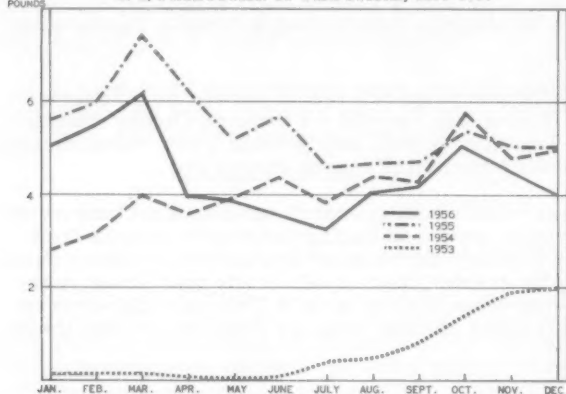
Note: Also see Commercial Fisheries Review, January 1957, p. 47.



U. S. Fish Stick Production

1956 PRODUCTION: The United States production of fish sticks amounted to 52.6 million pounds in 1956. This was a decrease of 20 percent as compared with the amount manufactured in 1955. Precooked fish sticks accounted for 87 percent

U. S. PRODUCTION OF FISH STICKS, 1953-1956



Month	1956	1955	1954	1953
	(1,000 Lbs.)	(1,000 Lbs.)	(1,000 Lbs.)	(1,000 Lbs.)
January . . .	4,862	5,601	2,771	115
February . .	5,323	5,954	3,180	133
March . . .	6,082	7,393	4,003	148
April	3,771	6,249	3,841	35
May	3,873	5,169	3,941	22
June	3,580	5,687	4,381	31
July	3,153	4,587	3,810	417
August	4,166	4,671	4,364	454
September . .	4,085	4,703	4,272	809
October . . .	5,063	5,356	5,637	1,435
November . .	4,585	5,042	4,803	1,902
December . .	4,019	4,972	4,959	2,001
Total . .	52,562	65,384	49,962	7,502

of the 1956 total while the remaining 13 percent consisted of uncooked sticks. Plants located

in the Atlantic Coast States produced 81 percent of the total. Firms in the interior of the country and in the Gulf States manufactured 12 percent while the remaining 7 percent was produced in the Pacific Coast States.

JANUARY-MARCH 1957: Preliminary statistical data indicate that the United States production of fish sticks during the first three months of 1957 amounted to 14.8 million pounds. This was a decrease of 11 percent as compared with the 16.6 million pounds produced during the first quarter of 1956.

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)	(1,000 Lbs.)	(1,000 Lbs.)
January	3,774	493	4,267
February	4,680	599	5,279
March	4,727	413	5,140
Total 1st. Quarter 1957 .	13,181	1,505	14,686
Total 1st. Quarter 1956 .	14,700	1,900	16,600
Total 1st. Quarter 1955 .	16,500	2,500	18,900

Production in the Atlantic Coast States accounted for 81 percent of the total followed by the

interior and Gulf States with 10 percent. The remaining 9 percent was manufactured in the Pacific Coast States.

Table 2 - U. S. Production of Fish Sticks by Areas, Jan.-Mar. 1956-57

Area	January-March			
	1957		1956	
	Number of Firms	Thousands of Pounds	Number of Firms	Thousands of Pounds
Atlantic Coast States	26	11,887	27	13,060
Interior and Gulf States	4	1,520	7	2,283
Pacific Coast States	11	1,279	10	1,259
Total	41	14,686	44	16,602

Precooked fish sticks (13.3 million pounds) accounted for 90 percent of the first-quarter total production while uncooked fish sticks accounted for 10 percent of the total.

Note: Also see *Commercial Fisheries Review*, Feb. 1956, p. 34; June 1956, p. 44; Aug. 1956, p. 50.



United States Fishing Fleet^{1/} Additions

MARCH 1957: A total of 41 vessels of 5 net tons and over were issued first documents as fishing craft during March 1957--24 more than during the correspond-

Table 1 - Vessels Issued First Documents as Fishing Craft, by Areas, March 1957 with Comparisons

Area	March		Jan.-Mar.		Total
	1957	1956	1957	1956	
	(Number)				
New England . . .	-	1	3	5	15
Middle Atlantic . .	5	2	10	7	26
Chesapeake . . .	5	4	22	12	138
South Atlantic . .	8	1	19	11	119
Gulf	12	5	22	15	100
Pacific	9	1	14	4	76
Great Lakes . . .	-	2	-	2	6
Alaska	2	1	8	3	40
Hawaii	-	-	-	1	1
Total	41	17	98	60	521

Note: Vessels assigned to the various sections on the basis of their home port.

^{1/} Includes both commercial and sport fishing craft.

Table 2 - Vessels Issued First Documents as Fishing Craft, by Tonnage, March 1957

Net Tons	Number
5 to 9	17
10 to 19	7
20 to 29	3
30 to 39	10
40 to 49	2
120 to 129	1
130 to 139	1
Total	41

ing month of 1956. The Gulf area led all others with 12 vessels, followed by the Pacific Coast area with 9, the South Atlantic area 8, the Chesapeake and Middle Atlantic areas 5 each, and Alaska 2.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JANUARY 1956: Imports of edible fresh, frozen, and processed fish and shellfish in January 1957 were higher by 29.5 percent in quantity and 18.4 percent in value as compared with the previous month. Compared with January 1956, the imports for January this year were up 0.4 percent in quantity and 4.0 percent in value. Imports for January 1957 averaged 28.2 cents a pound as compared with 27.2 cents a pound for the same month in 1956.

United States Foreign Trade in Edible Fishery Products, January 1957 with Comparisons						
Item	Quantity			Value		
	Jan.	Year		Jan.	Year	
	1957	1956	1956	1957	1956	1956
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish and shellfish:						
Fresh, frozen & processed/ . .	73.0	72.7	786.3	20.6	19.8	231.6
Exports:						
Fish and shellfish:						
processed/ only						
(excluding fresh and frozen) . . .	9.2	10.9	82.8	1.8	2.1	19.2
/ Includes pastes, sauces, clam chowder and juice, and other specialties.						

pounds. Compared with the 11.8 million pounds imported during the same month of 1956, this was a decrease of 2.5 million pounds or 22 percent. Reduced imports from Iceland and no imports from Norway, France, and West Germany were primarily responsible for the decrease in the total imports for March 1957.

Imports of groundfish fillets and blocks into the United States during the first three months of 1957 totaled 35.2 million pounds as compared with 38.1 million pounds during the same period of 1956. Canada led all other countries exporting fillets to this country with 24.9 million pounds, followed by Iceland with 7.6 million pounds, and Norway with 1.9 million pounds. These three countries accounted for 98 percent of the total imports for the first three months of 1957.

Note: See Chart 7 in this issue.



Wholesale Prices, March 1957

Catches of many of the major East Coast varieties were good and on the increase during March. Spring-run species moved inshore and the New England groundfish fishery was nearing its annual peak. Gulf shrimp fisheries were active, but catches were below normal. The Southern California tuna fishery was enjoying a healthy market, and the Great Lakes fisheries for whitefish and yellow pike were beginning to improve as the ice left the lakes.

In March 1957 the over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (119.4 percent of the 1947-49 average) rose 3.6 percent over the previous month and 5.6 percent over the index for March 1956. Except for drawn large haddock, price changes at wholesale during March for all items were slight. The price trend was generally upward or unchanged as compared with February 1957 and March 1956.

The increase of 9.2 percent in the drawn, dressed, or whole finfish wholesale prices from February to March this year was due to higher prices for large drawn haddock at Boston and for the fresh-water species. Wholesale prices for halibut (down 8.5 percent) and salmon (down 2.4 percent) showed signs of weakness because of liberal stocks on hand, but after an initial price drop the market appeared to stabilize at the lower price level. The March 1957 drawn, dressed, and whole finfish subgroup index was 7.7 percent higher than in March 1956 due to a price increase of 28.0 percent for large drawn haddock and of 41 percent for yellow pike. On the other hand, frozen halibut and whitefish were 2 to 4 percent lower this March than in the same month last year.

Exports of processed edible fish and shellfish in January 1957 increased about 17 percent in quantity as compared with the previous month, but were 15 percent below the same month in 1956. The January 1957 value of the exports was higher by 12.5 percent as compared with December 1956 but lower by 14.3 percent from the same month a year ago.

GROUND FISH FILLET IMPORTS, MARCH 1957: During March 1957, imports of groundfish (including ocean perch) fillets and blocks amounted to 9.2 million

The prices of the processed fresh fish and shellfish subgroup items in March 1957 increased by 7.6 percent as compared with the previous month and were higher by 12.8 percent than in March 1956. Higher fresh haddock fillet prices (up 32.6 percent) and fresh Florida shrimp prices (up 10.3 percent) were largely responsible for the increase between February and March this year. Both of these items sold higher this March (prices were up 15 percent for haddock fillets and 18.9 percent for shrimp) than in the same month in 1956.

Between February and March 1957 prices for the processed fish and shellfish subgroup decreased 3.5 percent due to a 10-percent drop in frozen haddock fillet prices at Boston and a decline of about 2 percent in frozen shrimp prices at Chicago. As compared with March 1956, the prices for the items in this subgroup in March 1957 were higher by 6.9 percent due almost entirely to higher frozen shrimp prices (up 14 percent).

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1957

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)			
			Mar. 1957	Feb. 1957	Mar. 1957	Feb. 1957	Jan. 1957	Mar. 1956
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.4	115.3	121.8	113.1
Fresh & Frozen Fishery Products:					132.0	124.9	136.2	120.6
Drawn, Dressed, or Whole Finfish:					123.4	113.0	134.1	114.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.06	100.5	60.7	143.6	78.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.34	95.9	105.2	108.3	98.0
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.62	.64	139.3	142.7	143.8	137.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.79	.69	195.8	171.1	146.3	204.5
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.90	.75	182.0	151.7	141.5	161.8
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.79	.70	161.8	143.4	116.8	168.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.74	.65	173.5	152.4	140.7	123.1
Processed, Fresh (Fish & Shellfish):					142.7	132.6	140.3	126.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.34	.26	117.4	88.5	158.2	102.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	.83	143.8	130.4	128.8	120.0
Oysters, shucked, standards	Norfolk	gal.	6.00	5.875	148.5	145.4	151.6	139.2
Processed, Frozen (Fish & Shellfish):					120.1	124.4	122.7	112.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.31	87.9	97.3	94.2	91.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.29	114.8	114.8	114.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.84	.85	128.9	131.2	130.0	113.0
Canned Fishery Products:					101.5	101.5	101.5	102.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.20	11.20	80.8	80.8	80.8	85.1
Sardines, Calif., tom, pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	9.00	9.00	105.0	105.0	105.0	83.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.95	7.95	84.6	84.6	84.6	89.9

^{1/}Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs.

These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Wholesale prices for canned fish remained steady during March 1957 at February levels and were less than 1 percent below March 1956 levels. As compared with March 1956, lower wholesale prices this March for canned Maine sardines and canned tuna were just about offset by a 26-percent increase in California sardine prices.





International

CANADA AND UNITED STATES AGREE ON NORTHWEST PACIFIC FISHERY REGULATIONS

United States and Canadian conferees on March 1 recommended coordinated regulations in the oceanic salmon and certain other fisheries in the Northwest Pacific Ocean. Nets in offshore salmon fishing will not be permitted. The spring or chinook salmon troll fishing season will open not earlier than April 15 and will close October 31. The June 15 opening date on trolling for silvers or cohos will remain unchanged. Troll-caught chinook salmon will be required to be 26 inches minimum length or an equivalent minimum weight. In the petrale sole fishery, a uniform closed season from December 20 to April 15 will be established, according to a March 1 news release by the Washington State Department of Fisheries.

At present Canada does not have seasons for troll-caught chinook or a minimum length regulation, or a season on petrale sole. British Columbia for 1957 has set an April 15 opening date for troll-caught chinook, and closed the petrale sole fishery from February 1 through April 15. Some net fishing for salmon has been carried out on the high seas exterior to the Strait of Juan de Fuca. In 1955 a gill-net fishery in "outside" waters began to develop.

Washington, Oregon, and California are moving the needed laws through the current Legislatures. Canada can put into effect by administrative action such regulations as are necessary. It is planned that this coordinated system of regulations will take effect in the three states and Canada in time for the coming fishing seasons. Failure of action in any one of the four jurisdictions may jeopardize the entire program.

The meeting represents a long step forward in securing coordination of regulations to conserve Pacific Coast fisheries. Hitherto, the measures of Washington, Oregon, and California have been coordinated through the Pacific Marine Fisheries Commission. The recommendations of the conference when approved by the Legislatures and administrative action taken by Canada will mean that regulations along the entire Pacific Coast will be coordinated.

The meetings, which were held in the Salmon Bay Regional Office of the Washington Department of Fisheries, were attended by officials from the U. S. Fish and Wildlife Service, the Department of State, Canada, members of the Legislatures and officials of the Pacific Coast states, as well as commissioners of the Pacific Marine Fisheries Commission and advisors from industry.

The recent growth of the net salmon fishery threatened existing United States and Canadian salmon conservation programs. Such fishing already is forbidden in waters off the coast of Alaska by order of the Secretary of the Interior.

The conference also took note of a special problem which exists in the area adjacent to the Bonilla Point-Tatoosh Island line at the entrance to the Strait of Juan de Fuca, and agreed that mutual scientific studies would be inaugurated by Canada and the State of Washington in those waters.

Finally, arrangements on procedures for continued international review of coordinated regulations were reached.

FISHERY SCIENTISTS MEET IN LISBON

A joint scientific meeting of fishery scientists was scheduled by the International Commission for the Northwest Atlantic Fisheries, the International Council for the Exploration of the Sea, and the Food and Agriculture Organization (FAO) in Lisbon, May 27-June 3 this year.

It was expected that more than 50 scientific papers dealing with the effects of fishing, fishing effort, and selection in fishing were to be presented. Scientists from at least 15 different countries were to participate in the meeting.

General principles in connection with fish population dynamics were to be deduced from the papers, with particular relevance to the cod, haddock, hake, ocean perch, and halibut fisheries.

There were to be three working parties at the meeting. The discussion on the effects of fishing was to deal with the characteristics of fishing gear and methods, and the use of such gear, especially in connection with the magnitude and composition of catches. It was to be concerned with a diversity of activities, such as hydrographic and meteorological work and even with underwater observation of the behavior of fishing gear.

Papers on fishing effort were to deal with such items as single and mixed fishing methods, technical developments, and data at present available.

The working party dealing with selection was to consider detection and identification of selection processes.

Other items were to include measurement of selection, problems of experimental work, and techniques of analyzing and presenting data. For example, one item in the program was to be concerned with causes of variation. This was to include consideration of behavior patterns, abundance and shape of fish, mesh dimensions, materials used in making fishing gear, speed and length of tow, and so on.

It was hoped that the meeting would indicate what further research is needed in the North Atlantic.

WHALING

ANTARCTIC 1956/57 SEASON: The 1956/57 pelagic whaling in the Antarctic ended at midnight March 16, after the 20 participating expeditions had reached the over-all quota of 14,500 blue-whale units, as fixed by the International Whaling Commission. As the opening gun was fired January 7, the season lasted 69 days. The actual catch exceeded the quota by 234 units. Rough weather during the last two weeks of the season seriously hampered whaling operations. The limit for the 1955/56 season was 15,000 units and 15,500 units for 1954/55.

Norway: Final figures from the nine Norwegian expeditions which participated in this year's Antarctic whaling show a total production of 855,489 barrels of whale oil, or 200,641 barrels more than during the 1955/56 season. Sperm oil production was substantially smaller--97,784 barrels, as against 128,810 barrels during 1955/56. However, the combined whale and sperm oil production adds up to 953,273 barrels, which is 169,615 barrels more than in the preceding season.

Leading Norwegian whaling operators believe the voluntary reduction of catcher vessels has proved its value. An agreement to that effect was signed by the Norwegian, British, Dutch, Japanese, and South African whaling companies, all privately-owned. Only the Soviet Union failed to reduce the number of catcher vessels, points out the Norwegian Information Service in an April 4 news release.

By using fewer catcher vessels, Norwegian experts say, whaling expeditions can operate more economically. Besides requiring less investment, it also means substantial fuel savings.

Netherlands: This season's Antarctic whaling yielded 15,414 long tons of train oil and sperm oil as compared to 16,361 tons for the previous season for the Netherlands fleet. Practically no advance sales were made this year.

Russia: A Russian whaling fleet caught more whales--1,180 of them--than any other of the 20 fleets from 6 nations which took part in the 70-day Antarctic whaling season which ended March 16. Japan's Nishi Maru fleet was second with 987 whales.

* * * * *

ACCORD ON NEUTRAL WHALING OBSERVERS: An agreement concerning a special neutral observation service for pelagic whaling was drafted at a conference held in Oslo March 20-21, 1957, of representatives of 4 of the 5 countries which are engaged in pelagic whaling in the Antarctic. The draft agreement will be presented to the respective governments for consideration and signature.

Norway had called the conference several weeks before and had invited all countries engaged in Antarctic whaling to participate. Japan, the United Kingdom, and The Netherlands accepted. The U. S. S. R. declined.

Except for the important fact that the U. S. S. R. did not participate, the conference is regarded as successful by the Norwegian Foreign Ministry. Its object was to advance the long-sought aim of Norway, and that of many other countries interested in whaling, to have neutral observers on whaling expeditions in the Antarctic, a March 28 dispatch from the United States Embassy at Oslo states.

Signature of the draft agreement cannot be expected for several months at the earliest. Although the preliminary steps to be taken by the governments in the ratification process are not yet clear, some of them will have to present the draft to their legislatures. The Japanese Diet, for example, will not act on the draft until next winter.

Article VII of the Oslo draft agreement provides that the agreement shall cease to have effect as and when an agreement under the International Whaling Convention comes into effect. The draft agreement is open to accession by any country having whaling expeditions, or expeditions under its jurisdiction, operating in the Antarctic.

Paragraph 1 of Article II provides that the observers shall be of a nationality different from that of the governments which are parties to the agreement, unless the committee established by the contracting governments to administer the agreement, and consisting of a representative of each of the participating governments, shall unanimously agree otherwise.

These observers would not have to be technically specialized. They would have no executive functions and would only have to observe whether the expeditions started and ended on dates specified by the International Whaling Commission, whether certain types of whales were caught only in designated periods, and whether the whales caught met requirements for size, within reasonable conditions.

The Norwegian Foreign Office is currently preparing instructions to its missions abroad to inform those governments that are parties to the International Whaling Convention of the results of the Oslo Conference. Copies of the draft agreement will be transmitted to these governments at the the same time.

The desire to have neutral observers on board whale factoryships is a matter of urgency to the Norwegians in order to insure fair play under the rules of the International Whaling Convention. In the past opposition on the part of Soviet Russia has prevented the acceptance of a protocol to the Convention to permit neutral observers on Antarctic whale factoryships. The refusal on the part of Soviet Russia to attend the March 20 conference was not unexpected.

An example of why the Norwegians mistrust the observance of the rules of the International Whaling Commission was provided by a Norwegian captain who returned after a month in the Antarctic. This observer stated that the Russian whaling fleet arrived with 18 catcher boats as compared with 15 last season. The Norwegians, British, and South Africans had agreed among themselves to limit their fleets to 12 catcher boats each.



Angola

PILCHARD-MAASBANKER FISHERY: During a visit of an Angolan-Portuguese Government Mission to the Union of South Africa in October 1956, it was reported by the Mission that a record catch of 400,000 metric tons of fish, mostly pilchards and maasbanker, was made in 1956 by the 2,000 European and 10,000 African fishermen who fish off the 350-mile coast of Angola. About 200 motor fishing vessels and many motorless smaller vessels were engaged in the fisheries and landed at ports between the Cunene River to Lobito Bay. The same Benguela Current that helps to support the lucrative fisheries of the Union of South Africa's west coast and Walvis Bay contributes to Angola's fisheries.

The fishing industry of Angola is controlled by a semi-Government organization known as the "Gremio dos Industriais de Pesca." This organization handles all exports, controls quality, and supervises buying. It is an association of fishing companies organized into "Gremios" of the districts of Luanda, Benguela, and Mosmedes which are federated in the central "Gremio" named above.

A three-man Portuguese mission, which revealed this information, visited the Union of South Africa to study the fishing industries in South Africa and Walvis Bay in order to obtain ideas of how to modernize Angola's processing and catching activities. Although the Angolan fishermen have made excellent catches, their processing and catching methods have not kept pace with the rapid increase in catch. The fishing industry of Angola has developed very much as a family business, with many father and son combinations both catching the fish and salting and drying the catch ashore. As a result, no large fishing centers have developed along the 350-mile coastline of the Portuguese Province.

The output of many family units has grown with the addition of larger Diesel-powered vessels either built in Angola or brought in from Portugal, but ashore the small family units have continued the traditional methods of salting and drying fish for sale to native Angolans and for export to other nearby African countries.

Due to the interest shown by the Mission in the fisheries of the Union of South Africa and also the European fisheries (which were visited previously), it is predicted that the fishing industry of Angola will be substantially modernized in the next five years. Under present conditions the record catch of 400,000 tons of pil-

chards and maasbanker was estimated to yield 40,000 tons of fish meal, small quantities of fish oil, and little or no canned fish (South African Shipping News and Fishing Industry Review, December 1956).



Brazil

TUNA CANNING PROSPECTS EXPLORED BY U. S. FIRM: A representative of a west coast tuna cannery spent most of the month of February in the Recife area exploring the possibilities of organizing a joint Brazilian-United States company to produce and can albacore tuna. Several days were spent on Fernando de Noronha Island where he was cordially received by the Governor, states a March 12 dispatch from the United States Consulate at Recife.



British Honduras

EXPORTS OF FISHERY PRODUCTS, 1956: Exports of all fishery products from British Honduras during 1956 totaled 265,483 pounds (valued at US\$100,528), an increase in quantity of 17.8 percent as compared with 1955 exports.

During 1956 the United States received 125,011 pounds of spiny lobster tails (value US\$81,556) and 240 pounds of whole spiny lobsters (value US\$52). In the same period of 1955, exports to the United States consisted of 22,431 pounds of whole spiny lobster (value US\$5,889) and 79,885 pounds of spiny lobster tails (valued at US\$51,471).

The quantity shipped to the United States during 1956 was 47.2 percent of the total exports of fishery products as compared with 45.4 percent in 1955. In terms of value, the United States share was close to 81 percent in 1956 and 77 percent in 1955.



Canada

INSPECTION REGULATIONS FOR IMPORTED CANNED FISH AND SHELLFISH: The Canada Gazette, Part II, Volume 91, dated February 13, 1957, contains an amendment (dated Jan. 24, 1957) to the Meat and Canned Foods Act Canned Fish and Shellfish and Cannery Inspection Regulations. Section 28 is revoked and a new section substituted which provides for inspection upon arrival of any canned fish or shellfish imported into Canada.

Section 40 of the same regulation is revoked and a new section provides that no certificate shall be issued for canned salmon or canned herring which does not meet the requirements of Section 39. Other minor amendments are made to various sections of the regulations, states a February 18 dispatch from the United States Embassy at Ottawa.

The following amendments have been made:

1. Section 28 of the Canned Fish and Shellfish and Cannery Inspection Regulations is revoked and the following substituted therefor:

28. (1) Any canned fish or shellfish imported into Canada shall be subject to such inspection as the Minister may deem necessary and any

canned fish or shellfish which is found by an inspector not to be sound, wholesome and fit for human food may be seized and forfeited to Her Majesty and disposed of as the Minister may direct.

(2) No person shall import or attempt to import any canned fish or shellfish unless all marks on the cans which identify the canner, the date of packing and the coding of the lot, are clearly stamped or stencilled on both ends of the cases or containers in which such cans are shipped.

2. Section 40 of the said Regulations is revoked and the following substituted therefor:

40. No certificate shall be issued for canned salmon or canned herring found by the laboratory to be sound, wholesome and fit for human food but which does not meet the requirements of section 39; such salmon or herring may be reconditioned and presented for re-examination not later than six months from the date it was first inspected.

3. Section 52 of the said Regulations is revoked and the following substituted therefor:

52. A fee at the rate of one-half cent per case of forty-eight one-pound cans, or the equivalent thereof, shall be charged for the inspection of each parcel of canned salmon or canned herring.

4. Sections 54, 55, and 56 of the said Regulations are revoked.

5. Section 57 of the said Regulations is revoked and the following substituted therefor:

57. Imported canned salmon found by the laboratory to be sound, firm, well packed and in good merchantable condition shall be approved.

6. Section 59 of the said Regulations is revoked and the following substituted therefor:

59. Imported canned salmon found by the laboratory not to be sound, wholesome and fit for human food shall not be cleared for importation but may be returned to the shipper.

7. Section 60 of the said Regulations is revoked and the following substituted therefor:

60. (1) If the laboratory decision regarding the quality of a parcel of imported canned salmon is challenged by an importer within six months from the date of the laboratory examination, the Minister may order a reinspection which shall be final; there shall be no appeal unless the Minister is satisfied that the identity of the parcel in question has been preserved.

(2) A fee of fifteen dollars (\$15.00) shall be charged for each reinspection of imported canned salmon under appeal but this fee shall be returned to the importer if the original decision of the laboratory is not confirmed upon reinspection.

8. Section 62 of the said Regulations is revoked and the following substituted therefor:

62. A fee at the rate of one-half cent per case of forty-eight one-pound cans, or the equivalent thereof, shall be charged for the inspection of each parcel of imported canned salmon.

SALMON OFFSHORE NET FISHING IN PACIFIC BANNED: After May 1 British Columbia fishermen will not be permitted to fish for salmon with nets in the offshore waters of the North Pacific, the Canadian Fisheries Department announced on April 12. In order to put into effect the recommendations agreed upon by Canadian and United States fishery representatives at a conference in Seattle in February, the Department has amended the regulations.

Legislation with similar restrictions on United States fishermen has been passed by both Washington and Oregon and is expected to become law in the near future. California is expected to follow with similar legislation. The U. S. Department of the Interior has already issued regulations which prohibit salmon offshore net fishing by Alaska fishermen.



Chile

FISH MEAL AND CANNERY PLANT TO BE ESTABLISHED: An investment of about US\$235,000 (10 million pesetas) in a fish meal plant and cannery to be located in Valparaíso was authorized by the Chilean Government by Decree No. 1096 of October 13, 1956. A firm from Vigo, Spain, will install the equipment in the new plant.

The new venture provides for investment in four 40- to 50-ton fishing vessels, a freezing plant, motor vehicles, fish meal and cannery equipment. The fish meal plant is to have a daily maximum capacity of 75 tons.



Colombia

CANNED SARDINE MARKET: There are two Colombia packing companies at the present time engaged in the production of canned sardines, shrimp, oysters, and clams. These companies operate on the north coast of Colombia and usually pack the two varieties of sardine available called "machuelo" and "lisa." The annual domestic production of sardines, estimated at 6,000 cases of 48 1-lb. oval cans, is considered to be inadequate to meet the demand of the Colombia market. Because of the limited quantity of sardines and the difficulty of obtaining cans from the United States, it is believed that domestic production is not very important and that Colombia will continue to depend to a large extent on imports to meet the requirements, states a December 14 dispatch from the United States Embassy at Bogota.

Approximately 40 percent of the total consumption of sardines is satisfied by domestic production. In view of the limited domestic production of canned sardines, and of the current unavailability and high cost of imported sardines (due to customs duties and other restrictions), consumption is believed to be declining at the present time.

Fifty percent of the consumers prefer the 1-lb. oval cans, while 35 percent use the 3½ to 5 oz. flat can, and 15 percent the 8-oz. tall can. About 90 percent of the sardines consumed are packed in tomato sauce. The percentage of sardines consumed by the high, middle, and low income groups is estimated at 60, 35, and 5 percent, respectively. Retail market prices for the domestic 1-lb. ovals packed in tomato sauce range from Ps. 2.20-2.50 (31-36 U.S. cents) a can. The retail prices for the imported 1-lb. ovals range from Ps. 2.65-2.95 (38-42 cents); the 3½ to 5-oz., Ps. 1.55-2.00 (22-29 cents); and the 8-oz. tall, Ps. 1.20-1.50 (17-21 cents).

By Decree No. 2643 of November 2, 1956, the Colombian Government placed canned sardines on the Prohibited List of Imports. Therefore, the exportation of this commodity to Colombia is not feasible at the present time, since no import licenses are issued for items on the Prohibited List.

Canned sardines, both domestic and imported, are usually distributed by importers (by direct importation and through sales agents) and retailers handling provisions of all kinds.

Note: Values converted at the rate of 7.00 pesos = US\$1.



Cuba

CLOSED SEASONS FOR SPINY LOBSTER AND SPONGES: The Institute Nacional de Pesca, in accordance with its authority under Decree 2724 of October 5, 1956, has provided for the following closed seasons on certain marine species:

1. Starts the closed season on spiny lobster (*Langosta*) on March 10, 1957, to continue until otherwise ordered by another Resolution.
2. That the closed season on sponges start on March 10, 1957, to include breeding places and fisheries in the Eastern region as defined by Article 74 of the Regulations of the Fisheries Law, and to be effective this year also along the South Coast to the west of an imaginary line mentioned in said Article 74 from Batabano, in a westerly direction to Cape San Antonio.

The above actions were published as resolutions in the Official Gazette, No. 42 of March 1, 1957 (U. S. Embassy in Habana dispatch, March 14, 1957).



Denmark

FILLET GRADING MACHINE DEVELOPED: New Danish automatic grading machines for fillets have been installed by British filleting firms at Hull, Fleetwood, and Grimsby. The model installed at Grimsby can grade 5,000-6,000 fillets an hour in 12 size grades.

Fillets are simply fed by one worker into the revolving turntable by hand, and each fillet is automatically graded and falls out into its appropriate container (The Fishing News, January 4, 1957).

The machine consists of 18 balanced sections, radially mounted on a powerful turning machine. A $\frac{3}{4}$ hp. electric motor of 1,400 r. p. m. operates the turning machine, and all moving parts are specially made for operation in damp atmospheres and protection against rusting.



Danish fillet grading machine. Diameter--6.2 feet; height--3.6 feet.

Balance sections consist of parallelogram balances mounted on oil-bath steering boxes. The frictionless bearings are of fine steel designed to "swim" for per-

fect adjustment. On one side of the balance is a tubular bowl which can be opened at the bottom. Ten weights are mounted on a plate on the other side and these decide the different weight intervals. They are released from the plate by means of organs, mounted on a shaft through the steering box. In the end of the shaft, under the bowl, a pawl wheel is mounted, and in the other end the above mentioned gear wheel.

The machine is used as follows: As the bowls are turned by the machine and pass underneath the machine, the shaft in the steering box will also turn round, and every time a bowl passes a pail, a weight will be released from the plate, and as soon as so many weights have been released from the plate (the bowl and its unit are only $\frac{1}{2}$ gram heavier), the bowl will bob down. As soon as the bowl has moved 1 mm., the pawl wheel will open the bottom of the bowl, and the fillet will slide down into the pail corresponding to its weight.



Ecuador

FOREIGN SHRIMP VESSELS EXCLUDED: An executive decree has been issued which prohibits shrimp fishing in Ecuadorian waters by foreign fishing vessels and vessels not built in Ecuador. National companies which now hire foreign flag shrimp vessels under Government permits may continue to use them provided the boats are nationalized when the permits expire.

Foreign shrimp vessels were already excluded from Ecuadorian continental waters unless contracted by national companies, and even in such case, the law already contemplated their ultimate nationalization. For some time shrimp vessels of good quality have been built in Ecuador. At least one United States-owned national company contracts exclusively for locally-built vessels.

A national fishing company owned by United States interests will be allowed to operate again provided it installs a freezing plant within 180 days and other installations within one year, according to a decree issued December 31, 1956.

The company's permit was withdrawn several months ago and a fine imposed for failure to set up an industrial establishment as provided in its contract, the United States Embassy pointed out in a dispatch (February 15).



Iceland

FROZEN FISH INDUSTRY: At the end of 1955 there were some 79 quick-freezing plants in operation in Iceland, either wholly or in part engaged in the preparation of frozen fish. In addition, two trawlers are fitted with small quick-freezing plants, each with a capacity of 2 tons of fish fillets in 24 hours. (Note: Another report recently received listed 81 shore plants and 4 freezer-equipped trawlers.) The maximum total capacity of all Icelandic freezing plants under ideal conditions is reckoned to be 1,100 metric tons of fish fillets in a working day of 16 hours. The storage capacity of these plants is close to 40,000 tons. It should be noted that included in this figure is storage room for 8,000 tons of frozen herring used as bait.

The total annual production of frozen fish fillets during the last two years has exceeded 50,000 tons. Until 1950 the largest part of the production consisted of cod fillets. In the same year the plants began to prepare and freeze ocean perch fillets, and since then this aspect of the operation has been steadily increasing.

In 1955 cod fillets made up 52 percent, ocean perch fillets 38 percent, and other types of fish 10 percent of total production.

The first freezing plants to be constructed in Iceland were in many respects primitive, and the same might be said of plants built during World War II, since at that time many essential materials were unobtainable. As a result it has proved necessary to rebuild many of the plants during the last few years; this extensive rebuilding program may be considered to be near completion. At the same time as the plant facilities were being renewed, the organization of production methods has been changed drastically and the mechanization of the operation has increased to a high degree. Machines for scaling and washing the fish are now to be found in almost every quick-freezing plant, and the same is true of conveyor belts for moving fish, fillets, and offal. In some cases the offal is moved by running water, but this is not a common arrangement. The work of filleting is still done by hand. Filleting machines manufactured abroad have been tried, but as of the end of 1955 no machines yet tested had given sufficiently good results. During the first part of 1956, a Danish and a German filleting machine were tested, but the results of these tests are not yet available. It looks, however, as if one of these machines will give satisfactory results. (Note: Large orders are now being filled in Germany for filleting machines.) Due to rising wages and shortages of qualified manpower, it has long been necessary to find means of mechanizing the filleting operation. At the same time it is obvious that the requirements for performance of filleting machines are much higher in this country than in most others due to the great variety of the raw material and the relatively fast tempo of the filleting and packing operation.

For some time skinning machines have been in operation in all of the larger freezing plants. Packing and weighing, on the other hand, is still an operation performed largely by hand.

In the quick-freezing of fish fillets, the most common practice now is to use ammonia piped directly into the freezing plates. Most of the frozen herring is frozen in plate freezers, both in the case of herring used for bait and frozen herring for export. A certain quantity of herring is put into trays and frozen in special chambers. The freezing of herring for bait by saturation or wet-freezing is unknown in this country, since experience has shown that bait herring treated in this fashion is not as good as dry-frozen herring.

In the older quick-freezing plants the storage rooms and their insulation were built to provide a storage temperature of -20°C . (-4°F .). Now all new storage rooms are constructed to provide storage temperature of -28°C . (-18.4°F .). Regulations of the Icelandic Fisheries Inspection still only require a maximum storage temperature of -20°C . (4°F .), and there are no provisions for the degree of temperature based upon the length of time for storage, which as a rule cannot be determined beforehand.

Until recently most of the fish received by the quick-freezing plants was caught by drifters going out for a day and night at a time, consequently the fish was usually handled by the plant a few hours after capture. As a result of the ban against the landing of Icelandic fish in Great Britain, the trawlers began in 1952 to bring their iced fish ashore in Iceland to an ever-increasing degree, for further handling ashore. The cod is cured as stockfish, while the ocean perch, which makes up the largest part of the catch in the summer and fall, is brought to the freezing plants, where it is filleted and frozen.

Since the freezing plants began to receive iced ocean perch in large quantities, the difficulties involved in preserving the quality of the raw material have increased. The attempt is made to overcome these added difficulties by strengthening the inspection and control of the quick-freezing process, both on the part of the official Fisheries Inspection and on the part of inspectors employed by the Freezing Plants Association.

As a part of the technical development which in the last number of years has been taking place within the quick-freezing industry, many of the freezing plants have installed self-regulating machines for the manufacture of ice. In most instances these machines have a capacity of 5 to 15 tons in 24 hours. Most common are machines manufacturing flake ice while machines turning out ice cubes are also known. Machinery for producing ice blocks has now been in operation for a number of years, and it seems that self-regulating machines will soon be exclusively in use. Recently the manufacture of machines for making flake ice was begun in this country.

In close connection with the manufacture of ice, experiments have been made with the use of a number of chemical preservative agents, which are mixed with the water before it is frozen, for the purpose of preserving the fish longer. Among the chemical agents which have been tried here is a German product named "Foromycin" and another American product. "Foromycin" is an aldehyde solution, while the American product is a trade name for "Chlorteracycline," which is a chemical agent used for preservation of foodstuffs. The final results of these experiments are not yet available. It can still be safely said that the use of these chemical agents is likely to increase the time that iced fish can be kept in good condition, even though the preservative qualities of these chemicals under normal Icelandic conditions have not proved to be as great as one might expect from experiments in other countries. (Excerpt from a report by Thordur Thorbjarnarson, Director of the Experimental Laboratories of the Icelandic Fisheries Association, to a technical convention in Denmark and transmitted to the United States by the United States Embassy in Reykjavik, October 30, 1956).



Israel

RED SEA FISHERY PROSPECTS EXPLORED: Future prospects for the exploitation by Israel of the Red Sea fisheries are in the balance now that the United Nations are in control of the Gaza Strip. Plans for a fishery and a trade route in the warm Gulf of Aqaba and on into the Red Sea are important to the future economy of Israel.

The plan is to develop a tuna fishery based at Eilat, an Israeli port at the north end of the Gulf off Aqaba directly connected with the Red Sea. An Italian fisheries report has been engaged and negotiations are in progress for a Japanese tuna-fishing experimental trip in the area.

In 1943 the British biologist Bertram made an extensive collection in the Gulf of Aqaba and in 1946 Haas, now professor of zoology at Jerusalem, made economic studies for Spinneys, the Palestine food distributors, who held a British Mandate concession to exploit the fishery.

Since then, the Israeli fishery scientists have made considerable study of the fish from Eilat. H. Stemitz, of Jerusalem University, and A. Ben-Tuya, of the Haifa Sea Fisheries' Research Station, have listed 183 species of fish from records made by various workers in the Gulf.

The Gulf of Aqaba list includes barracuda, garfish, sea eels, halfbeaks, one grey, and two red mullets, snappers, grunts, four scaly-finned butterfly fish, ten kinds of wrasse, four blennies, a parrotfish, a sand eel, a suckerfish, puffers, and globefish. Shoals of bonito (Katsuwonus pelamis) and lesser bonito, and some albacore (Neothunnus albacora) are potential food.

Like the rest of the Red Sea, the Gulf of Aqaba has hammerhead sharks and sting rays, but not electric and eagle rays. It has moonfish but no sunfish; the large wolf herring but no true herrings, sardinellas, or anchovies.

It differs further from the rest of the Red Sea in the absence of flounders, soles, tarpon, gurnards, filefish, whiting, perch (*Sillagos*), croakers, and dolphin, so far as is at present known. Several of the fish are local varieties of typical Indian and Pacific ocean species.

The work of Steinitz and Bentuva was handicapped because they could not get access through Arab "No Man's Land" to the Bertram collection in the old Hebrew University site on Mount Scopus.

In 1954, they listed an Indian Ocean sea perch (*Anyperodon leucogrammicus*) for the first time and a rare frogfish (*Barchatus cirrhosus*), only once previously known in the Gulf. Sometimes, as in 1954, shoals of Indo-Pacific milkfish (*Chanos*) visit the Gulf and in February shoals of flyingfish appear there (*Fishing News*, March 22, 1957).



Italy

CANNED MACKEREL AND JACK MACKEREL MARKET: Official Italian figures on imports, production, and consumption of canned mackerel (Italian name "sgombro") and jack mackerel ("sordello") are not available. However, a recent dispatch (March 6, 1957) from the United States Embassy at Rome reports that Italy's main supplier of jack mackerel is South Africa, while the leading suppliers of mackerel are Holland and Germany. The price of mackerel (48 1-lb. cans a case, c.i.f.) from Holland (3,460 lire or US\$5.54) and from Germany (3,600 lire or US\$5.76) is higher than jack mackerel from South Africa (3,190 lire or US\$5.10), which is considered inferior in consumer appeal.

No import figures are available except that 1956 imports from South Africa are estimated at 1,200-1,300 metric tons valued at 160 million lire (US\$256,000), against 300 metric tons valued at 47 million lire (US\$75,200) in 1955.

The canned fish available in the local trade are almost all preserved natural, except for fillets originating in Morocco and Portugal which are preserved in olive oil and from Peru in fish oil.

Imports of canned fish from the United States are subject to ministerial license. The possibility of importing mackerel and jack mackerel from the United States was studied recently by Italian importers, but both prices and import restrictions discouraged Italian companies. Mackerel and jack mackerel are included in the item "others" (canned fish not included elsewhere) of the Italian tariff No. 159a (statistic No. 409). The Italian customs duty on canned mackerel and jack mackerel is 27 percent ad valorem, but the duty on mackerel is reduced to 22 percent for General Agreement on Tariff and Trade countries.

Note: Values converted at the rate of 625 lire equal US\$1.



Japan

ALBACORE BUYING FOR EXPORT SLOW DUE TO HIGH EX-VESEL PRICES:

The tuna freezers have set their frozen albacore export quotas for the second half of 1957 at 12,000 short tons, but with the ex-vessel price at 340-350 yen a kan

(US\$228-235 a ton) and the Joint Sales Company's export price at US\$270 a ton, the freezers are refraining from buying, so it looks as if the quota may be left unfilled.

Calculating back from the Joint Sales Company's price of US\$270 would give an ex-vessel price of about 310 yen a kan (US\$208 a ton). Therefore, it is said that the highest price that can profitably be paid for first-class fish for export would be about 315 yen a kan (US\$212 a ton). With the ex-vessel prices running 340-369 yen a kan (US\$228-242 a ton) in the Shimizu-Yaizu area and 320-330 yen a kan (US\$2.15-\$2.22 a ton) at Tokyo and Misaki, the freezers are not actively buying.

The present high prices are thought to be caused by aggressive buying by Japanese canners. This factor has a particularly strong effect on ex-vessel prices in the Shimizu-Yaizu area. Since it appears that the canners intend to continue buying around May, it is thought that there is little chance of the price coming down to where the freezers can buy unless there is a very large catch, points out the Nippon Suisan Shimbun (February 25, 1957).

Note: Values converted at the rate of 360 yen = US\$1. 1 kan = 8,267 pounds.

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FIRST LANDINGS OF 1957 SUMMER ALBACORE REPORTED: Recently with regard to albacore for export to the United States, there has been a strong preference for the larger fish, and Japanese canners and freezers have been waiting impatiently for the changeover from the small winter albacore, which have a great deal of "green" meat, to the large summer fish. On March 20 the first landings of summer albacore were made at Shimizu, when the No. 8 Benten Maru brought in about 8 tons of pole-and-line caught fish, weighing 31-33 pounds each from the waters around Nishinoshima in the Bonin group. The fish were snapped up by canners at the excellent price of 385-400 yen per kan (US\$262-272 a metric ton). About 200 vessels from Shizuoka ports are fishing in the area, and canners are busy with preparations to switch from oranges to tuna, the Nippon Suisan Shimbun of March 27 reports.

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EXPORTS OF FISHERY AND ALLIED PRODUCTS, 1954-56: Japan's exports of fish and fish preparations (mostly canned and frozen fish and shellfish, but excluding agar-agar, fish and marine-animal oils, pearls, etc.) to all countries reached a record high of 196,489 metric tons, valued at US\$120.6 million, in 1956. This was an increase in value of 59.5 percent as compared with 1955 (see table). Of these exports, 46.8 percent were shipped to the United States.

Japanese Fish and Fish Preparations ¹ / Exports, 1954-56						
Destination and Type of Product	Quantity			Value		
	1956	1955	1954	1956	1955	1954
	... (Metric Tons) (US\$1,000) ...		
<u>Exports to United States:</u>						
Tuna, frozen	44,217	258,457	48,870	13,603	18,377	19,369
Tuna, canned	12,929	9,449	6,738	11,648	8,880	7,672
Crab meat, canned	2,374	2,137	1,120	5,233	4,560	2,486
Other fishery products, canned	16,343	10,098	9,635	14,552	8,008	7,449
All other fishery products . .	15,996	4,120	4,984	8,867	3,325	2,896
Total to United States . .	91,859	84,261	69,347	53,903	43,150	39,872
Exports to all Countries . .	196,489	155,106	140,747	120,630	75,628	74,242
	(Percent)					
Percentage Exported to U. S. .	46.8	54.3	49.3	44.7	57.1	53.7

¹/ Exclusive of fish and marine animal oils, pearls, and agar-agar.

In addition to fish and fish preparations exports, Japan shipped to the United States 12,233 metric tons (valued at US\$4.6 million) of fish and marine-animal oils

in 1956 as compared with 11,409 tons (valued at US\$5.2 million) in 1955 and 4,584 tons (valued at US\$3.2 million) in 1954. The value of worked natural and cultured pearls exported to the United States rose from US\$3.6 million in 1954 to US\$5.6 million in 1955 to US\$6.8 million in 1956.

Japanese agar-agar exports to all countries dropped from 815 metric tons (valued at US\$3.0 million) in 1955 to 698 tons (valued at US\$2.1 million) in 1956. Exports of this product in 1954 amounted to 684 tons (valued at US\$2.7 million).

The value of Japanese 1956 exports of only fish and fish preparations made up 4.8 percent of the total value of all Japanese exports.

FISH NET INDUSTRY PREDICTS DISAPPOINTING YEAR: Fish net manufacturers and exporters in Mie Prefecture of Japan are deeply disturbed over the slackened demand for fish netting and twine domestically and their inability to meet foreign demand due to the Ministry of International Trade and Industry (MITI) quota list. In previous years the busiest months for the industry have been January and February when orders from domestic and United States fishing companies reach their peak. This year, however, the combination of controls on exports to the United States and uncertainty over the Soviet position on Japanese fishing in the northern part of the Japan Sea threatens seriously to affect the industry in the coming year, a March 11 United States dispatch from Nagoya points out.

The Japan Textile Goods Exporters Association has announced that in 1956 Japan exported \$5.4 million of fish netting (\$3 million of cotton netting and \$2.4 million of synthetic fiber netting) of which one half was manufactured in Mie Prefecture. According to a Mie Prefectural Government survey, Mie Prefecture produced 4,584,000 pounds of fish netting in 1956 valued at \$8,481,111. This represents a 30 percent increase over 1955 and amounts to 30 percent of the national total.

The major domestic buyers of fish nets are the companies engaged in salmon and trout fishing in the northern Japan Sea. These companies normally purchase approximately \$6.3 million of fish netting annually, but the manufacturers fear that if a satisfactory fisheries agreement with the Soviet Union is not reached in the near future, sales to those Japanese companies concerned could drop to one half of the 1956 total.

A further source of concern is that orders from the United States for sardine nets manufactured in the MITI Nagoya District (Aichi, Mie, Gifu, Nagoya, Shizuoka prefectures) far exceed the export quota for the area. The quota on exports to the United States for the period January through April 1957 was originally divided into three subquotas: 10,000 pounds for the MITI Tokyo District, 20,000 pounds for the MITI Osaka District, and 120,000 pounds for the MITI Nagoya District. Later 65,000 pounds was transferred from the Nagoya quota to the Osaka quota to alleviate the hardship that other cotton quotas were working on that area. As of February 10, 1957, orders had already amounted to approximately 35,000 pounds of the new 55,000-pound quota for the Nagoya area. Fish net manufacturers and exporters are now predicting that unless this district's quota is increased by 35,000 pounds they will be unable to meet their orders.

PEARL WASTE EXPORT TO RED CHINA: The Mie Branch of the Japan-China Friendship Society has received a letter from the Shanghai Office of the Red China Export Corporation expressing interest in importing "natural pearls" from Mie Prefecture on a barter basis in exchange for camphor oil.

The Mie "natural pearl" is a small irregular pearl formed by sand absorbed by pearl oysters before the nucleus is inserted. Except for a small quantity which is used in cosmetics, these pearls are regarded as unusable waste.

A Mie prefectural assemblyman took samples of the pearls to the Red China Sample Fair held in Shanghai in December 1956. The Red China Export Corporation referred to these samples in its letter and offered to make an initial purchase of ¥100 million (\$277,778). Such pearls are used in China as raw material for an "antifebrile" (presumably a drug to reduce fever), states a March 11 United States consular dispatch from Nagoya.

The Mie Prefectural Government is gathering information on the market for camphor oil in Japan and preparing a report on the natural pearl production capacity of Mie pearl farms.



Malaya

CANNED MACKEREL MARKET: There is no domestic production of canned mackerel in Malaya, and there is always a steady market for all varieties of canned fish in this territory, especially pilchards, sardines, and herring.

Statistics for canned mackerel are not available. However, it has been ascertained that imports have been negligible. The more popular sizes of cans used in Singapore are the 15-oz. tall (20 percent) and 15-oz. oval (80 percent); and in the Federation of Malaya, 15-oz. tall (80 percent) and 15-oz. oval (20 percent). All of the pack is in tomato sauce. Retail prices for canned sardines, pilchards, and herring range from 18-24 U. S. cents a can.

Canned fish of all varieties can be imported into Malaya. Although imports into Singapore are free of duty there is a duty of 25 percent ad valorem and a preferential duty of 10 percent ad valorem on imports into the Federation of Malaya.

South Africa has virtually the monopoly in this market as far as pilchards and sardines are concerned owing to: (1) preferential duty, (2) even flow of supplies throughout the year, (3) good representation, (4) good demand, and (5) competitive prices.

By conforming to the requirements of this market as regards size of can, packing, as well as very competitive price and attractive presentation, plus active promotion on the part of local distributors--not forgetting regular supplies--United States exports to this territory can be increased appreciably, states a February 15, 1957, dispatch from the United States Embassy at Singapore.



Mexico

SPINY LOBSTER EXPORT DUTY INCREASED: The export duty on fresh or refrigerated cooked Mexican spiny lobster, effective February 16, 1957 (*Diario Oficial* February 15, 1957), was increased 10.5 percent. The new rate is slightly over 3.28 U. S. cents per gross pound. The increase was effected by raising the official valuation from 11.00 to 12.00 pesos per gross kilogram.

The export of live spiny lobsters from Mexico has been prohibited for some time, points out a United States Embassy dispatch (February 15) from Mexico.

SHRIMP EXPORT DUTY INCREASED: Mexican export duties were increased about 10 percent for fresh, iced and frozen shrimp from the Gulf of Mexico and about 15 percent for shrimp from the West Coast, effective February 9, 1957 (Diario Oficial, February 8, 1957). Export duties are now about 16.35 U. S. cents a pound for fresh iced shrimp from the Gulf of Mexico and about 17.35 cents a pound for West Coast fresh iced shrimp. Frozen shrimp from the Gulf of Mexico, Salina

Table 1 - Mexico's Official Prices and Export Duties for Frozen Shrimp

	Gulf of Mexico and Salina Cruz, Oaxaca, Santa Rosalia, Baja California		All Other Shipping Points	
	Peso	US\$	Peso	US\$
	(Per Metric Ton, Net)		(Per Metric Ton, Net)	
Official price	12,600.00	1,000.81	13,370.00	1,070.46
Specific duty	3.00	0.24	3.00	0.24
5 percent ad valorem	630.00	50.44	668.50	53.52
Subtotal	633.00	50.68	671.50	53.76
2 percent municipal	12.66	1.01	13.43	1.08
Total duty and tax	645.66	51.69	684.93	54.84

Cruz, Oaxaca, and Santa Rosalia, Baja California, now are dutiable at about 2.34 cents a pound and those from the West Coast (other than Salina Cruz, Oaxaca, and Santa Rosalia) about 2.49 cents a pound. The increase was effected by raising the official prices, states a dispatch from the U. S. Regional Fishery Attache in Mexico.

Table 2 - Mexico's Official Prices and Export Duties for Fresh Shrimp

	Gulf of Mexico		Pacific Coast	
	Peso	US\$	Peso	US\$
	(Per Metric Ton, Net)		(Per Metric Ton, Net)	
Official price	12,600.00	1,000.81	13,370.00	1,070.46
Specific duty	3.00	0.24	3.00	0.24
10 percent ad valorem	1,260.00	100.88	1,337.00	107.04
25 percent ad valorem	3,150.00	252.20	3,342.50	267.61
Subtotal	4,413.00	353.32	4,682.50	374.90
2 percent municipal tax	88.26	7.07	93.65	7.50
Total duty and tax	4,501.26	360.39	4,776.15	382.40

Note: Values converted at the rate of 12.49 pesos equal US\$1.



Norway

COD FISHERIES TRENDS TO MID-FEBRUARY 1957: Norway's spawning cod fisheries improved as of February 9, according to Fiskets Gang (February 14, 1957), a Norwegian fishery trade periodical. Through the date indicated, 10,091 metric tons of cod were landed as against 21,665 tons for a similar period in 1956. Of this season's catch, 2,281 tons were sold for drying (unsalted), 4,732 tons for curing, and 3,077 tons for the fresh trade. In addition 340 tons of steam-refined cod-liver oil were extracted, 134 tons of cod roe were cured, and 215 tons of cod roe were canned and iced. During the week ending February 9 fishing improved in all districts, but at the Lofoten Islands the schools were thin and scattered.

EARNINGS FROM FISHERY PRODUCTS EXPORTS SET RECORD IN 1956: Norwegian earnings from fishery products exports reached a record of US\$140 million in 1956, according to preliminary estimates (The Fishing News, January 4). These exports were also the largest on record in value. Dried fish exports were the largest since World War II and amounted to 30,000 metric tons. Exports of klipfish totaled 50,000 tons, about 10,000 tons more than in 1955. Frozen fillet exports of 16,000 tons were also up from the 14,000 tons exported in 1955. Exports of herring and herring meal were also exceptionally large.

FISH OIL PRODUCTION DOWN IN 1957: Preliminary estimates place the 1957 winter herring oil production in Norway at about 72,000 short tons. Herring oil output in 1956 was estimated at 115,000 short tons and meal production at 270,000 short tons. About 80 percent of the herring catch last year was processed by the meal and oil industry. In 1955 the industry produced about 80,000 short tons of herring oil and nearly 200,000 tons of herring meal.

Cold-cleared cod liver oil production in 1956 was estimated at 7,100 short tons, a sharp increase from the 4,100 tons produced in 1955, according to Foreign Crops and Markets, March 25, 1957, a publication of the U. S. Department of Commerce.

FISHERIES REVIEW, 1956: Fishing: Norway's fishermen landed a record-breaking catch of herring and other types of fish during 1956 that amounted to 1,960,000 metric tons. This total was 313,000 metric tons over 1955 and represented an increase of roughly 80 million kroner (US\$11.2 million) in ex-vessel value. The total ex-vessel value of the landed catch amounted to 666 million kroner (US\$93.2 million) versus 583 million kroner (US\$81.6 million) in 1955.

The catch of winter herring in 1956 constituted a record; the cod fisheries also increased their output over 1955. By contrast, the brisling catch has been described as a failure; the catch of small herring was also disappointing.

Marketing: The year 1956 was marked by many difficulties as far as fish sales were concerned. Basically the problem stemmed from mounting costs of production in the face of a world demand that was at least leveling off with a consequent depressive effect on prices. A product of decades of hard experience, the fish marketing system in Norway today is highly regulated with the object of preventing cut-throat competition and of assuring a guaranteed minimum price to the fishermen. On the other hand, Norwegian fishery products are sold on the world market at prices determined primarily by supply and demand. The fishermen have tried to even out the ups and downs of world prices by establishing equalization funds that are built up from the profits of the good years for the purpose of making up deficits in bad years; the accumulated reserves are limited, however, and the sums paid out during 1956 on the fish catch were approaching the critical point by the end of the year. A direct consequence of this development was the stimulation of demands by fishing groups that something be done to reverse the trend. No generally acceptable solution has yet appeared.

Exports: Exports of Norwegian fish products increased considerably in 1956, reflecting the favorable catches in all but brisling and small herring. Exports of fish and herring, and herring livestock feeds, but excluding herring oil, rose to 991 million kroner (US\$138.7 million), or by 13 percent.

Note: Also see Commercial Fisheries Review, March 1957, p. 51.



Panama

SHRIMP TO BE SHIPPED TO FLORIDA BY AIR: The largest producer and exporter of fresh and frozen shrimp in Panama has contracted for space with an operator of an international airline for shipments of frozen pink shrimp from Panama City to Miami, Fla. The firm requested guaranteed space, consisting of four planes a week, to transport 17,600 pounds of frozen shrimp per shipment for a period of approximately two months.

It is estimated that the shipping rate for shrimp from Panama to Miami is five cents a pound via air transport. The Panamanian shrimp will be trucked from Miami to Jacksonville at one cent a pound, according to a March 12 dispatch from the United States Embassy in Panama.



Peru

NEW FACTORYSHIP FOR FISH MEAL: A 2,500-ton vessel has recently been converted into a fish meal factoryship at a cost of US\$100,000. The converted vessel, with a capacity of 20-30 tons of fish meal daily will operate off the Peruvian coast, using sardines and "conjinoua," states a February 26 dispatch from the United States Embassy in Lima.



Republic of the Philippines

IMPORTS OF FISH OILS, 1953-56: Included in the Philippine imports of fats and oils were small quantities of cod-liver oil and other fish oils (see table), states a March 29, 1957, review of the Philippine fats and oils situation by the Foreign Agriculture Service of the U. S. Department of Agriculture.

Philippine Imports of Inedible Fish Oils, 1953-56				
Item and Country of Origin	1956	1955	1954	1953
 (Long Tons)			
Cod-liver Oil:				
United States . . .	9	29	19	23
Norway	5	12	80	32
Other Countries . .	13	7	-	2
Total	27	48	99	57
Other Fish Oils:				
United States . . .	-	2	35	23
Other Countries . .	6	4	-	-
Total	6	6	35	23



Portugal

FROZEN FISH DISTRIBUTION SYSTEM ESTABLISHED: The arrival of 3,000 metric tons of frozen fish from Germany the latter part of December 1956 marks the first attempt on the part of Portuguese fish distributors to supply consumers in the interior with fish, other than dried or salted. The first delivery of 3,000 tons is part of a contract calling for a total of 20,000 tons. Imports of frozen fish are considered to be necessary until the distribution system is established, thereafter local catches are to supply the fish for freezing.

The new system of frozen fish distribution, established by a Lisbon firm, will supply frozen fish to eight districts in the interior of the country. Plans include the erection of modern refrigeration plants in 16 inland centers. The first refrigeration plant was opened in Guarda about December 20 and will serve as a pilot op-

eration for other installations. The new cold-storage warehouses will serve as centers for a network of sales outlets, states a December 20 dispatch from the United States Embassy in Lisbon.

The new distribution system should facilitate carrying out the intent of the decree-law of September 27, 1956, by diverting salted sardines from the interior markets and making them available to the canners.

Note: Also see Commercial Fisheries Review, December 1956, p. 77.



Spain

VIGO FISHERIES TRENDS, 1956: Fishing: Landings of fish at Vigo during 1956 amounted to 57,701 metric tons (127.2 million pounds) as compared with 60,700 tons (133.8 million pounds) in 1955. Catches were quite poor during the early months of the year, but picked up as the season advanced. The 1956 catch of albacore tuna was good and later in the year there were signs of small sardines returning to Spanish coastal fishing grounds.

An increase in average prices for fresh fish is one more indication of the higher cost of living. Operating expenses of the fishing fleets and distributors went up as the result of the new official wage rates. It is said that the new wage scales represent an increase of about 30 percent for the fishing industry.

Landings at Vigo during November 1956 totaled 10.9 million pounds valued at about US\$963,970. The November catches were about 29 percent lower than those of the previous month and about 12 percent below the November 1955 catches. However, November 1956 was considered a fair month by the fishing industry.

Small and some medium-size sardines (3.4 million pounds) were the principal catches during November, followed by horse mackerel (*Trachurus trachurus*) with 1.9 million pounds. Albacore tuna catches were insignificant during November--as the season was over. One other species of commercial importance in November was the "castaneta" or dollarfish.

A number of fishing vessels operate out of small ports in the Province of Lugo, but part of the catches are landed at ports in Asturias, especially their albacore catches which amounted to 2.9 million pounds during the June to November season.

Canning: In 1956 the canneries in the Vigo area suffered from a chronic shortage of tinplate which was aggravated by the revaluation of the peseta from 357.7 to 715.0 paper pesetas per 100 gold pesetas in April. This had the effect of raising the import duty on tinplate. At the end of the year exports of canned fish were at a low level due to unfavorable exchange rates and uncertainty as to prices due to an estimated 30-percent increase in costs following wage and social security increases.

The fish canneries continue to be deeply concerned over the tinplate situation. Some of the leading canneries (about 14 in the Vigo area) make their own cans but have lithographing done outside. It is reported that the imports of tinplate amounted to 8,000 cases (approximately 1.7 million pounds) during November. However, a portion of this quantity reached other parts of Spain, but a fair share was made available to the canneries in the Vigo area. The supply of tinplate is considered inadequate by the canneries.

Olive oil for fish packing is usually scarce and often difficult to obtain. Although the official price is 18.6 U. S. cents a pound, there is an open market and the canneries usually find it necessary to pay higher prices. It is the general opinion, however, that there will be no serious shortage of olive oil and the prospects are good for an adequate supply during 1957.

For some cannery workers, there is an increase of 100 percent in wages. Women packers formerly earning around US\$0.51 a day are now being paid approximately US\$1.03 a day. It is believed that the price of canned fish will be increased about 20 percent in some manner as the result of the new wage scales. Domestic sales have been fair but slowed up slightly around the end of November.

Exports of canned fish also slowed up as of November, due to the price situation. The canneries now feel that the Spanish Government should allow a higher rate of exchange (presently 33,385 gold pesetas to the U. S. dollar) on exports or increase their percentage of foreign exchange (presently 20 percent) which is allowed for the payment of approved imports.

During December the canneries in the Vigo area purchased 1.9 million pounds of fresh fish at the local fish exchange as compared with 1.4 million pounds in December 1955.

December generally marks the beginning of a slow season for the canneries, due to the scarcity of suitable varieties of fresh fish during the winter months. Some canneries resort to anchovy packing, since anchovies can be purchased in brine.

The fish canneries in the Vigo area purchased 2.2 million pounds of fresh fish in November as compared with 4.9 million pounds for the previous month and 3.7 million pounds in November 1955. Most canneries were operating during November 1956, but on a reduced scale as compared with the previous month.

Small and medium-size sardines and clams were the principal species available for packing in November. However, during the latter part of November, the canneries commenced to purchase a portion of the heavy catches of horse mackerel. Fishing interests feel certain that the sardine is returning to Spanish coastal waters due to the presence of small fish in the catches. The present sardine catches range from 14-18 fish to a pound as compared with 11-13 a pound for the large sardine taken in past years.

Note: Values converted to US\$ equivalent at rate of 1 peseta equals US\$0.0257.



Sweden

FISHERIES LOAN FUND INCREASE REQUESTED: The Swedish Fishery Board has requested that the fund for loans to fishermen be increased from 2.6 million Swedish crowns (US\$504,000) to 5.0 million crowns (US\$969,000). The reason for this request is that for several years possibilities to obtain loans from the fund have been very limited. There are at present on hand applications for loans amounting to 6,302,675 crowns (US\$1,221,000), which is more than double the amount that may be granted. This situation presents difficulties not only to the individual fishermen but also to the Swedish fishing industry.

The present value of the craft and gear used in the fishing industry amounts to about 175 million crowns (US\$33,915,000) and in order to maintain the current value of the craft and gear, a minimum amount of 30 million crowns (US\$5,814,000) a year is required.

Since fishing chiefly is carried on by persons with little surplus capital and whose position has been further weakened by reduced catches and loss of gear, difficulties have arisen which have been further aggravated by the credit restrictions.

In order to increase profits Swedish east coast fishermen are especially interested in increased credit and a considerable part of the loan applications come from this district. Another factor accounting for the large amounts requested by fishermen in the east coast area is the large loss of gear that has taken place in the southern part of this district. This gear must be replaced if fishing is to continue on the same scale in this area.

The increased request for loans has resulted in reduced loans and 20 percent of the purchase value of craft or gear is the average granted. The credit restrictions have also reduced the number of fishing boats built for west coast fishermen from 20 vessels in 1955 to only 7 in 1956.



Thailand

CANNED SARDINE MARKET: In Thailand there are no sources of the true sardines or sardineline fish common in United States and Europe. A domestic fish, which is of the greatest importance to the Thai canned fish industry, is the "Pla-Tu" (*Rastrelliger chrysozonus*), a striped mackerel approximately six inches in length.

The Pla-Tu is the principal source of canned fish and is processed in each of the 12 major canneries of Thailand. These canneries also produce canned fruit, vegetables, and fish sauce for local consumption. The quality of canned Pla-Tu, although satisfactory by local standards, is considered inferior to that of imported sardine products.

In addition to commercial canneries, the Thai Army produces canned Pla-Tu for its own use, the surplus of which is sold on the local market. The surplus is estimated to be approximately 10,000 cans a year, with an annual value of 35,000 Baht (US\$1,750). At present, the Thai Navy is considering the possibilities of organizing its own cannery for the production of Pla-Tu.

Although detailed figures are not available from either Thai Government sources or the canning industry, local sources estimate that the total annual production of canned Pla-Tu is approximately 3.4 million cans of the 15-oz. size. The wholesale value of this pack is approximately 14.5 million Baht (US\$725,000). It is estimated also that the present production now exceeds the market demand by 20 percent. Taking the overproduction into consideration, the annual consumption of canned Pla-Tu is estimated at 60,000 cases (48 15-oz. cans a case).

The consumption of canned Pla-Tu is higher in the north and northeast of Thailand where fresh fish is scarce, and proportionately less in areas with an abundant supply of fresh fish. The largest consumers of canned Pla-Tu are in the lower and middle income groups. For reasons of taste and economy, canned fish is not considered part of the regular daily food of the Thai and Chinese.

For the canned Pla-Tu, 50 percent of the customers prefer the 15-oz. oval can, 25 percent the 7½-oz. oval, and 25 percent the 5-oz. flat. For style of pack, 100 percent prefer Pla-Tu in tomato sauce. Retail prices for canned Pla-Tu are: 7.50 Baht (37 U. S. cents) a can for the 15-oz. oval can, 3.5 Baht (17 U. S. cents) for the 7½-oz. oval, and 2.5 Baht (12 U. S. cents) for the 5-oz. flat.

Sardines, salmon, and tuna are the leading imported canned fishery products in Thailand. The consumption is largely limited to Western residents and the local higher income group.

Total imports of canned sardines during 1955 amounted to 46,264 pounds with a c.i.f. value of 216,974 Baht (US\$10,849). Fifty percent of the consumers use the 15-oz. oval; 20 percent, the 8-oz. oval; and 30 percent, the 4½-oz. rectangular can of sardines. Sixty percent of the consumers prefer canned sardines packed in tomato sauce, and 40 percent, olive oil. The percentage of sardines consumed by the high and middle income groups is estimated at 80 and 20 percent, respectively. The retail market price for the 15-oz. oval can of sardines packed in tomato sauce is 16 Baht (80 U. S. cents a can), 8-oz. oval in natural oil, 12 Baht (60 U. S. cents); 4½-oz. rectangular in olive oil, 6 Baht (30 U. S. cents); and 4½-oz. rectangular in tomato sauce, 5.5 Baht (27 U. S. cents).

There is no import control on canned fish at present in Thailand. The import duty, however, is 50 percent ad valorem (approximately 34 U. S. cents a pound).

Imports of canned salmon in 1955 amounted to only about 200 pounds.

Imports of canned fish January-August 1956 amounted to 41,897 pounds (c.i.f. value of 367,041 Baht or US\$18,352). Of these imports, 13,682 pounds (c.i.f. value 82,450 Baht or US\$4,123) consisted of sardines of which 3,276 pounds (c.i.f. value 16,630 Baht or US\$832) came from the United States. Canned salmon imports totaled 3,307 pounds (c.i.f. value 50,303 Baht or US\$2,515) of which 3,159 pounds (c.i.f. value of 47,931 Baht or US\$2,397) came from the United States. The balance of the canned fish imports amounted to 24,908 pounds (c.i.f. value of 234,288 Baht or US\$11,714) of which 13,028 pounds (c.i.f. value of 134,150 Baht or US\$6,708) were shipped from the United States.

Among the higher income group (including Western residents) the average annual per capita consumption of imported canned fish, mostly sardines, is approximately 3 pounds.

Among Thai and Chinese consumers the principal demand is for fresh and dried fish products. These products are abundant and available at prices within the range of the lowest income group. These factors tend to limit the consumption of domestic canned fish, which is only one-half the cost of imported canned fish. In view of the above, the general pattern of consumption is not expected to change appreciably in the near future, a February 9, 1957, dispatch from the United States Embassy at Bangkok points out.

In general, canned fish products are imported either directly by wholesalers or by general import companies. The largest supply of imported products is distributed to retailers in the general area of Bangkok, and only a small amount to other cities in the Provinces.



United Kingdom

FACTORYSHIP "FAIRTRY" PROVES SUCCESSFUL: The British stern-trawling factoryship the *M/V Fairtry* developed to fillet and freeze fish at sea, has landed 5,000 metric tons of fillets, 1,000 tons of fish meal, and 100 tons of cod-liver oil during 2½ years of continuous operations. The *Fairtry*, both as to methods of fishing with the otter-trawl and in the filleting and freezing of fish at sea, was admittedly somewhat of an experiment at the time the first trip was landed in July 1954. The tenth trip was completed in November 1956 and in the intervening 2½ years many technical and personnel problems have been overcome, according to an article in the November 23, 1956, issue of *The Fishing News*, a British trade publication.

The catches made by the factoryship are usually frozen and in the storage holds about six hours after capture. It is generally conceded that for eating qualities this frozen-at-sea fish is unrivaled.

At the start of the venture the Fairtry's production was very slow, even at times when fish were plentiful. To begin with it was not expected that the layout and arrangements on the fish deck and in the processing section would be even near perfect until tried out in practice, nor that the fishermen, new to the methods and gear employed in stern trawling, would avoid mistakes; and the fish workers, however skilled they might be in land-based production, were bound to find production at sea raised new and difficult problems.

Many alterations and improvements had to be made each time the ship arrived back from a fishing trip and time had to pass before the crews became thoroughly familiar with and skilled in their tasks. But slowly the fishing performance and production rate began to improve. New filleting machinery was ordered and installed in haste.

Most important of all, the turnover of personnel serving from voyage to voyage began to decrease as men found the terms and conditions of the job to their satisfaction. As the struggle to obtain good crews slackened and good men presented themselves for re-employment, voyage after voyage the morale on board improved and grew high.

The vessel holds over 600 tons of frozen fillets, 100 tons of fish meal, and 50 tons of liver oil and can remain at sea for over 80 days before requiring to refuel.

CANNED SARDINELIKE FISH IMPORTS: The imports of pilchards, sardines, and sild by country of origin for 1954-56 were incorrectly shown in "Table 3 - Canned Sardineline Fish Imports into United Kingdom, 1954-56" published on page 110 of the November 1956 issue of Commercial Fisheries Review. A revised table showing the correct United Kingdom imports for all sardineline fish follows:

Table 3 - Canned Sardineline Fish Imports into United Kingdom, 1954-56									
Product & Principal Country of Origin	January-April 1956			12 Months 1955			12 Months 1954		
	Quantity		Value	Quantity		Value	Quantity		Value
	1,000 Lbs.	L1,000		1,000 Lbs.	L1,000		1,000 Lbs.	L1,000	
Brisling:									
Norway	82	21	60	1,867	507	1,421	3,760	1,045	2,925
Denmark	6	1	3	23	4	10	15	3	7
Other	1	1	1	5	1	2	1	1/	1
Total	89	23	64	1,895	512	1,433	3,776	1,048	2,933
Pilchards:									
Union of South Africa	995	69	193	4,922	328	919	2,139	154	431
South-West Africa .	4,961	347	973	12,460	799	2,237	5,903	374	1,046
Other	-	1/	1/	2	1/	1/	2	1/	1
Total	5,956	416	1,166	17,384	1,127	3,156	8,044	528	1,478
Sardines:									
France	53	12	34	47	11	29	227	50	140
Portugal	2,557	376	1,053	13,209	1,842	5,158	14,720	2,038	5,707
Yugoslavia	-	-	-	-	-	-	301	25	70
French Morocco . . .	10	1	3	9	1	3	801	107	300
Other	47	6	15	99	13	36	170	21	59
Total	2,667	395	1,105	13,364	1,867	5,226	16,219	2,241	6,276
Sild:									
Norway	192	37	104	321	63	177	629	121	338
Other	-	-	1/	6	1	3	1/	1/	1/
Total	192	37	104	327	64	180	629	121	338
Grand Total	8,904	871	2,439	32,970	3,570	9,995	28,668	3,938	11,025

1/ LESS THAN 1,000 LBS., L1,000, OR US\$1,000.

SUBSIDIES FOR FISHING INDUSTRY INCREASED: A further £879,000 (US\$2,461,200) to help the fishing industry during the current year is included in supplementary estimates for the British Ministry of Agriculture and Fisheries presented to the Commons early in February. This will raise the total for the year to £5,728,770 (US\$16,640,556).

The largest portion of the new allocation £660,000 (US\$1,848,000) is needed for the White Fish Authority's (W.F.A.) increased grants to fishermen for vessels and engines, states the February 15 issue of The Fishing News.

Total sum available for grants goes up to £1,610,000 (US\$4,508,000) but it is expected that the W.F.A. will save £300,000 (US\$840,000) on loans to fishermen.

An additional £187,000 (US\$523,600) is needed by the W.F.A. for loans for re-organization and development of the industry, making a total of £247,000 (US\$691,600).

Higher subsidies to near- and middle-water vessels will cost a further £315,000 (US\$882,000).

Scottish fisheries and the United Kingdom herring industry need a further £49,950 (US\$138,600), making a total of £2,479,951 (US\$6,943,863).



TASTE IMPORTANT TO ATTRACT THE CONSUMERS

Give your customers food that tastes good and advertise your products, a former Kentucky Governor told some 800 delegates to the 12th annual convention of the National Fisheries Institute April 29, 1957. The address entitled "The Bait That's Best," advised taking advantage of impulse buying and cooperating with other industries.

He pointed out that United States food consumption is increasing at a rate of more than 4 billion pounds a year. People have more money to spend for food; they are eating more and better food than ever before. "When it comes to interesting the public," he said, "it's the taste of the fish that determines the best bait, not the taste of the fisherman."

"One of the most revolutionary developments in recent years," he pointed out, "has been the phenomenal growth of the frozen food industry." "Last year 8.7 billion pounds of frozen foods were distributed in the United States. Of that quantity, 316 million pounds was fish processed in this country. An additional 260 million pounds was imported."



"As you angle for more of the housewife's dollar, remember you've got a convenience food in frozen fish to offer her," he said.

He emphasized that one-third of American women are employed in full-time jobs and therefore are especially interested in foods that are prepared quickly and with the minimum of labor.

"The modern woman," he said, "can throw together a 30-minute meal that looks like she spent two hours on it." But ease

of preparation is not enough. "The consumer fears inferior quality and if she gets it she's through."

Impulse buying accounts for a high percent of purchases in supermarkets. A recent survey shows, for example, that 87 percent of frozen fish bought resulted from decisions made after entering the store; 73 percent of fresh fish, and 82 percent of canned fish were bought on impulse. This makes attractive packages a highly important feature of "the bait that's best" for the buying public.

--Address given at the 12th Annual Convention of the National Fisheries Institute, April 29, 1957, Chicago, Ill.



Department of the Interior

DELEGATION OF AUTHORITY TO ASSISTANT SECRETARY FOR FISH AND WILDLIFE:

Office of the Secretary

[Order 2509, Amdt. 24]

ASSISTANT SECRETARY FOR FISH AND WILDLIFE

DELEGATION OF AUTHORITY

MARCH 27, 1957.

Order No. 2509, as amended is further amended as indicated below, to delegate authority to the Assistant Secretary for Fish and Wildlife:

1. Section 1 (17 F. R. 6793, 8634) is further amended to read as follows:

SECTION 1. *Under Secretary, Assistant Secretaries of the Interior, Administrative Assistant Secretary.* (a) The Under Secretary, the Assistant Secretaries of the Interior, and the Administrative Assistant Secretary may severally exercise all of the authority of the Secretary of the Interior with respect to any matter, except:

- (1) The signing of correspondence addressed to the President;
- (2) The issuance of orders delegating the authority of the Secretary;
- (3) The exercise of powers delegated by the President to the Secretary without any authorization for redelegation;
- (4) The issuance of regulatory documents, which are subject to codification in the Code of Federal Regulations (44 U. S. C., sec. 305; 1 CFR 1.10), other than public land orders; and

(5) The making of appointments under section 710 of the Defense Production Act of 1950, as amended (50 U. S. C. App., sec. 2160).

(b) Notwithstanding the limitation contained in subparagraph (2) of paragraph (a) of this section:

(1) The Under Secretary, the Assistant Secretaries of the Interior, and the Administrative Assistant Secretary may severally authorize officers or employees of the Department to sign on behalf of the United States contracts the provisions of which have been approved by the Under Secretary, an Assistant Secretary, or the Administrative Assistant Secretary; and

(2) The Administrative Assistant Secretary may, in writing, redelegate or authorize the redelegation of such portions of the authority of the Secretary with respect to matters in the field of administrative management, including matters relating to budget, finance, personnel (except appointments under section 710 of the Defense Production Act of 1950, as amended), management research, property management, and administrative services, as the Administrative Assistant Secretary may deem appropriate.

2. A new section, numbered 4 and reading as follows, is added:

Sec. 4. *Assistant Secretary for Fish and Wildlife.* (a) The Assistant Secre-

The April 3 Federal Register contained the following order which delegates authority to the Assistant Secretary for Fish and Wildlife (a new position established by the Fish and Wildlife Act of 1956):

tary for Fish and Wildlife may exercise all of the authority of the Secretary of the Interior with respect to any fish and wildlife matters, except

- (1) The signing of correspondence addressed to the President;
- (2) The issuance of orders delegating the authority of the Secretary;

(3) The exercise of powers delegated by the President to the Secretary without any authorization for redelegation;

(4) The issuance of regulatory documents, which are subject to codification in the Code of Federal Regulations (44 U. S. C., sec. 305; 1 CFR 1.10); and

(5) The making of appointments under section 710 of the Defense Production Act of 1950, as amended (50 U. S. C. App., sec. 2160).

(b) Notwithstanding the limitation contained in subparagraph (2) of paragraph (a) of this section the Assistant Secretary for Fish and Wildlife may authorize officers or employees of the Department to sign on behalf of the United States contracts or loan agreements the provisions of which have been approved by the Assistant Secretary for Fish and Wildlife.

(Sec. 2, Reorganization Plan No. 3 of 1950, 5 U. S. C., 1332-15, note; Sec. 3, Fish and Wildlife Act of 1956, 70 Stat. 1120)

HATFIELD CHILSON,
Acting Secretary of the Interior.

UNITED STATES FISH AND WILDLIFE SERVICE

ALASKA BARS IMPORTS OF KING SALMON EARLY IN THE YEAR:

No king salmon caught in the waters off the coasts of Washington, Oregon, California, or British Columbia could be landed in Alaska before April 15, according to a March 26 ruling of the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service. Regardless of whether the catch was made in open waters beyond the territorial limits, the ruling bars the import

of king salmon during the closed season in Alaska.

The only exception to the landing regulation is that of king salmon taken from those parts of the inside waters of South-eastern Alaska open to fishing before that date.

At the same time, it was also announced that the closed season on troll-caught king salmon in the outside waters was extended to April 15. Originally the season had been scheduled to open March 15.

BUREAU OF COMMERCIAL FISHERIES POSTS TO BE FILLED BY CAREER PERSONNEL:

Following the policy determined by Interior Secretary Fred A. Seaton, the intention to appoint career fisheries employees to the key positions of Director and Assistant Director in the Bureau of Commercial Fisheries of the reorganized United States Fish and Wildlife Service was announced on April 2 by Assistant Secretary Ross L. Leffler.

The name of Donald L. McKernan, Administrator, Alaska Commercial Fisheries, for the post of Director of the new Bureau of Commercial Fisheries has been submitted to the United States Civil Service Commission for its approval, and Andrew W. Anderson, Chief of the Branch of Commercial Fisheries, has been designated as Assistant Director. Both are career fisheries employees of the Service.

McKernan transferred to the position of Administrator of Alaska Commercial Fisheries in June 1955, after having served for 3½ years as Assistant Director of the Fish and Wildlife Service's Pacific Oceanic Fishery Investigations in Honolulu, Hawaii. He also had extensive research and administration experience with the Washington State Department of Fisheries, where he was in charge of research on the shellfish resources of the State.



Donald L. McKernan

In 1950, McKernan spent four months in Japan as visiting fisheries expert at the request of the Department of the Army. He is a graduate of the University of Washington, and has completed more than two years of graduate work at that university.

Anderson, who was born April 25, 1901 in Dawson, Yukon Territory, Canada, joined the old Bureau of Fisheries in 1930 as a statistical and marketing agent. He is a graduate of the College of Fisheries of the University of Washington.



Andrew W. Anderson

In 1937 Anderson organized the Fishery Market News Service which, through a nationwide reporting system, keeps the fishing industry informed on production, shipments, sales, storage, and imports of fishery products. In 1943 he was named Chief of the Branch of Commercial Fisheries. He has served as fishery advisor on United States delegations to FAO conferences, as well as at the conference at Baguio which established the Indo-Pacific Fisheries Council. In June 1952 he was designated Deputy Administrator of the Defense Fisheries Administration in the Department of the Interior. Previously he had been Chief of the Office of Operations in the defense fisheries organization, and was responsible for much of that agency's functional activities.

SPECIAL ASSISTANT TO COMMISSIONER NAMED:

The appointment of Robert H. Johnson, Assistant Director of the United States Fish and Wildlife Service since 1955, to the position of Special Assistant to the Commissioner of Fish and Wildlife, was announced April 2 by Assistant Secretary of the Interior Ross L. Leffler.

Johnson, before coming to the Service, was prominent in New England conservation circles and from 1948 to 1955 was Director of the Division of Fisheries and Game of the State of Massachusetts. As

Assistant Director of Fish and Wildlife Service, he was in charge of the wildlife program.

In his new post, Johnson will serve as the immediate and personal assistant to Commissioner Arnie J. Suomela in all matters pertaining to fish and wildlife. He will be vitally concerned with problems of both the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife in connection with the



Robert H. Johnson

Commissioner's supervision and coordination of those two units which make up the United States Fish and Wildlife Service.

Active in the old New England Fish and Game Administrators group and its successor, the Northeastern Fish and Game Commissioner's Association, he was also a member of the International Association of Game, Fish and Conservation Commissioners and on its executive committee when he joined the Service staff.



Department of the Treasury

BUREAU OF CUSTOMS

UNITED STATES CANNED IN BRINE TUNA IMPORTS IN 1957 UNDER QUOTA PROVISIO:

Because of final data furnished by the United States Fish and Wildlife Service on the United States pack of canned tuna during the calendar year 1956, a revision has been made in the quantity of tuna canned in brine which may be imported during the calendar year 1957 at the 12½-per cent rate of duty. The amount has been reduced from 45,460,000 pounds to 44,528,533 pounds.

The notice announcing the revision as published in the April 2 Federal Register follows:

DEPARTMENT OF THE TREASURY

Bureau of Customs

[T. D. 54331]

TUNA FISH

REVISED TARIFF-RATE QUOTA FOR CALENDAR YEAR 1957

MARCH 27, 1957.

Treasury Decision 54299 sets forth the estimated quantity of tuna fish which may be entered for consumption or withdrawn from warehouse for consumption during the calendar year 1957 at the rate of 12½ per centum ad valorem under paragraph 718 (b), Tariff Act of 1930, as modified.

On the basis of final data furnished by the United States Fish and Wildlife Service on the United States pack of canned tuna during the calendar year 1956, it has been determined that 44,528,533 pounds of tuna may be entered, or withdrawn, for consumption during the calendar year 1957 at the rate of 12½ per centum ad valorem under paragraph 718 (b) of the tariff act, as modified. Quota-class tuna entered, or withdrawn, for consumption during the year in excess of this quantity will be dutiable at the full rate of 25 per centum ad valorem under paragraph 718 (b).

[SEAL]

RALPH KELLY,
Commissioner of Customs.



Small Business Administration

GROUP LOAN TO BOSTON FISHERIES COOPERATIVE:

The details of a group loan to the Boston Fisheries Cooperative, Inc., for the benefit of the member companies in participation with a Boston bank were published in the March 23 Federal Register as follows:

SMALL BUSINESS ADMINISTRATION

Office of the Administrator

[SBA Group Loan 2]

GROUP LOAN TO BOSTON FISHERIES COOPERATIVE, INC., FOR BENEFIT OF MEMBER COMPANIES IN PARTICIPATION WITH THE FIRST NATIONAL BANK OF BOSTON

Pursuant to section 207 (a) (2) of the Small Business Act of 1953, as amended, the request of The First National Bank of Boston, Boston, Massachusetts (hereinafter called "Bank"), on an Application dated June 11, 1956, and Boston Fisheries Cooperative, Inc., Boston, Massachusetts (hereinafter called "Borrower"), on an Application dated June 8, 1956, for an immediate participation of 90 percent of a loan in the amount of \$1,000,000 to be made by Bank to Borrower for the benefit

of certain members of the Borrower, was approved by the Administrator on July 18, 1956.

The Administrator has found that the operations of Borrower and its member firms in connection with said loan contribute to the needs of small business. Prior to the making of this finding, the Administrator consulted with the Attorney General and with the Chairman of the Federal Trade Commission, and the Attorney General has concurred in writing in such finding and approval.

Borrower and the member firms, namely:

O'Hara Bros.
Bay Fish Co.
Baker, Bolef & Watson Co.
Bart Tribuna Co., Inc.
Blue Sea Fish Co.
Boston Fish Co.
Caastus Hunt Co.
Columbia Seafoods, Inc.
Coral Sea Fisheries Inc.
Diamond Fisheries, Inc.
Eastern Seafood Co.
F. E. Harding Co.
Hub Sea Food Corp.
John Mantla & Sons Co., Inc.
L. B. Goodspeed Inc.
New England Fillet Co., Inc.

No. Atlantic Fish Co., Inc.
Shamrock Fisheries, Inc.
Super Snooty Seafood, Inc.
Warren Fitch Co., Inc.

are hereby granted immunity from prosecution under the Federal Antitrust Laws and the Federal Trade Commission Act, insofar as they may apply to the activities of the said Borrower and the said member firms conducted pursuant to the said loan.

Dated: March 12, 1957.

WENDELL B. BARNES,
Administrator.

Note: Also see Commercial Fisheries Review, January 1957, p. 87.



Eighty-Fifth Congress (First Session)

Listed below are public bills and resolutions introduced and referred to committees or passed by the Eighty-Fifth Congress (First Session) and signed by the President that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown in this section when introduced and, if passed, when signed by the President; but also shown from month to month are the more pertinent reports, hearings, or chamber actions on some bills.



ALASKA STATEHOOD: H. R. 50 (Bartlett) and other House bills on this subject. Hearings were held by the House Interior and Insular Affairs Committee, March 11-29. An amendment to the bill would leave management of the Territory's fish and wildlife affairs with the U. S. Department of the Interior for five years after statehood. See Commercial Fisheries Review, February 1957, p. 62, for other bills on this subject.

ANTIDUMPING ACT OF 1921 AMENDMENT: S. 1860 (Byrd and Martin) introduced in the Senate on April 12, a bill to amend certain provisions of the Anti-Dumping Act of 1921, to provide greater certainty, speed, and efficiency in the enforcement thereof; to the Committee on Finance. This bill is a companion Senate bill to six or more other bills introduced in the House during this Session. See Commercial Fisheries Review March 1957, p. 59, and April 1957, p. 65, for other bills on this subject.

CHEMICAL ADDITIVES IN FOOD: H. R. 6747 (Harris) introduced in the House on April 9, a bill to protect the public health by amending the Federal Food, Drug, and Cosmetic Act to prohibit the use in food of chemical additives which have not been adequately tested to establish their safety; to the Committee on Interstate and Foreign Commerce.

Also: introduced in the Senate on April 16, S. 1895 (Hill and Smith of New Jersey), similar to H. R. 6747; to the Senate Committee on Labor and Public Welfare. See Commercial Fisheries Review, February 1957, p. 63, for other bills on this subject.

DEPRESSED AREAS AID: H. R. 7029 (Fenton) and H. R. 7046 (Saylor) introduced in the House on April 18, bills to establish a program of financial and technical assistance designed to alleviate conditions of substantial and persistent unemployment in economically depressed areas, and for other purposes; to the Committee on Banking and Currency. Similar in purpose to S. 1433 (Martin and others) introduced February 28, also H. R. 5459 (Carrigg) and H. R. 5500 (Van Zandt) introduced on same day in the House. See Commercial Fisheries Review, March 1957, p. 59, under title Aid For Depressed Areas for these bills.

FISH AND WILDLIFE CONSERVATION TO BE EVALUATED IN FLOOD CONTROL PROJECTS:

H. R. 7465 (Smith of Mississippi) introduced in the House on May 13, a bill to make the evaluation of recreational benefits and fish and wildlife conservation, resulting from any flood control, navigation, or reclamation project an integral part of project planning, and for other purposes; to the Committee on Interior and Insular Affairs. The bill provides that the evaluation of fish and wildlife benefits shall be based on standards prescribed by the Secretary of the Interior, and upon investigations made by the U. S. Fish and Wildlife Service and the state fish and game agencies.

FISHERY PRODUCTS SURPLUSES FOR EXPORT:

S. 1830 (Magnuson and Jackson) introduced in the Senate on April 9, a bill to provide that certain surplus fishery products may be exported under the Agricultural Trade Development Act of 1954; to the Committee on Agriculture and Forestry. The bill provides for amendment to section 106 of the Agricultural Trade Development and Assistance Act of 1954 by inserting before the period at the end thereof the following: "and the term 'surplus agricultural commodity' shall also be deemed to include herring oil and other fish oil, and any other fishery product, produced in Alaska or elsewhere in the United States, which the Secretary of the Interior certifies to the Secretary of Agriculture as having been determined by him to be reasonably expected to be in excess of domestic requirements, adequate carryover and anticipated exports for dollars."

FISH HATCHERIES: H. R. 6807 (Withrow) introduced in the Senate April 10, a bill to provide for the establishment of a fish hatchery in the State of Wisconsin; to the Committee on Merchant Marine and Fisheries. Also: S. 1784 (Young) introduced in the Senate April 4, a bill to provide for the establishment of a hatchery in the State of North Dakota; to the Committee on Interstate and Foreign Commerce. See Commercial Fisheries Review, February 1957, p. 64, for additional bills on fish hatcheries.

FISHING VESSEL RIGHTS ON THE HIGH SEAS: H. R. 5526 (Bonner) introduced March 4, also H. R. 5886 (Tollefson), H. R. 5888 (Wilson), H. R. 5943 (Magnuson) introduced March 12 to 13. These bills would amend the Act of August 27, 1954 (68 Stat. 863) relating to the rights of vessels of the United States on the high seas and in the territorial waters of foreign countries. Hearings were held before the House Subcommittee on Fisheries and Wildlife Conservation of the Committee on Interstate and Foreign Commerce on H. R. 5526 starting April 17. The bill was unreported as of May 15. See Commercial Fisheries Review, March 1957, p. 59, and April 1957, p. 66, for the above bills.

IMPORT QUOTAS: H. R. 6806 (Van Zandt) and H. R. 6812 (Dorn) introduced in the House on April 10, a bill to regulate the foreign commerce of the United States by establishing import quotas under specified conditions, and for other purposes; also: H. R. 7072 (Saylor) introduced in the House April 29, H. R. 7527 (Lane) introduced in the House on May 14, and H. R. 7400 (Patterson) introduced in the House on May 9; all referred to the Committee on Ways and Means. Similar in purposes to 15 or more other bills previously introduced, except for methods of establishing the import quotas. See Commercial Fisheries Review, February 1957, p. 64, March 1957, p. 59, and April 1957, p. 66, for other bills on this subject.

IMPORT RESTRICTIONS OF FOREIGN FISHERY PRODUCTS URGED BY ALASKA: The Legislature of the Territory of Alaska has forwarded to Congress a memorial requesting that immediate and appropriate steps be taken to restrict the importation of foreign-caught and processed fish, and that more stringent international regulations of pelagic fishing be promulgated; to the Committee on Interior and Insular Affairs.

NORTHWEST ATLANTIC FISHERIES COMMISSION: Protocol to the International Convention for the Northwest Atlantic, signed at Washington June 25, 1956. Passed the Senate on May 13 by unanimous vote. Provides for permission for the Commission, established by that Convention, to hold its annual meetings outside of North America, if the parties so desire. Sent to President on May 13.

SCHOOL LUNCH ACT TO BE EXTENDED: H. R. 6980 (Elliot) introduced in the House on April 17, a bill to amend the National School Lunch Act to permit junior colleges to participate therein; to the Committee on Education and Labor. Similar to H. R. 3248 (Rhodes) introduced on January 17 (Commercial Fisheries Review, February 1957, p. 65).

SMALL BUSINESS ACT AMENDMENT: H. R. 7543 (Yates) introduced in the House on May 14, a

bill to amend the Small Business Act of 1953, as amended; to the Committee on Banking and Currency. Similar or related to numerous other bills previously introduced for the aid of small business. See Commercial Fisheries Review, February 1957, pp. 66 and 67, and April 1957, p. 66, for similar bills.

SMALL BUSINESS INTERNAL REVENUE AMENDMENT: H. R. 7056 (Widnal) introduced in the House on April 18, a bill to amend the Internal Revenue Code to assist small business, and for other purposes; to the Committee on Ways and Means. See Commercial Fisheries Review, April 1957, p. 66, for similar bill.

SMALL BUSINESS TAX RELIEF: H. R. 6889 (Harvey) introduced in the House on April 15, a bill to provide a minimum initial program of tax relief for small business and for persons engaged in small business; Also: H. R. 7136 (Laird) introduced in the House May 2; both bills referred to the House Committee on Ways and Means. See Commercial Fisheries Review, April 1957, p. 67, for additional bills on the subject.

SOCKEY SALMON FISHERY ACT: H. R. 6769 (Magnuson) introduced in the House on April 9, a bill to amend the Sockeye Salmon Fishery Act of 1947; to the Committee on Merchant Marine and Fisheries. See Commercial Fisheries Review, April 1957, p. 67, for other bills on this subject. Also: S. 1806 (Magnuson and Jackson) introduced in Senate on April 4 was reported favorably, with amendments, on May 8 (S. Rept. No. 302), by the Senate Committee on Interstate and Foreign Commerce.

Senate Report No. 302, Enabling Act to Provide for the Implementation of the Pink Salmon Treaty Between United States and Canada, signed at Ottawa, Canada, December 28, 1956 (May 13, 1957, 85th Congress, 1st Session) to accompany S. 1806, 12 pp., printed. The bill provides for an amendment to the Act making possible the preservation and management of the pink salmon under the coordinated program established for the sockeye salmon between the United States and Canada for the Fraser River system and Puget Sound Area, and provides for funds for United States participation. Presents the testimony of government and private agencies regarding the bill.

SOIL BANK ACT OF 1956 AMENDMENT: H. R. 6714 (Jones) introduced in the House April 8, a bill to amend the Soil Bank Act of March 28, 1956, in order to provide for greater utilization of the technical services and facilities of the State game and fish agencies in the administration of the conservation reserve and for other purposes; referred to the Committee on Agriculture. This bill provides for an amendment to the Soil Bank Act which instructs the Secretary of Agriculture with respect to conservation aspects under this title to consult with soil conservation districts, State foresters, State game fish agencies, land grant colleges, and other appropriate agencies of State governments, and with the United States Fish and Wildlife Service, in the formulation of programs at the State and county levels.

STATE DEPARTMENT APPROPRIATIONS: H. R. 6871 providing funds for International Fisheries Commissions passed the House on April 17 and was

sent to the Senate. The bill provides for the following amounts for fiscal year 1958:

	1957 Appropriations	1958 Budget Request	1958 House Bill
International Pacific Halibut Comm. . . .	\$7,170	108,000	108,000
International Pacific Salmon Fisheries Commission	173,550	181,050	181,050
Inter-American Tropical Tuna Comm. . . .	352,725	362,500	362,500
International Commission for the North- west Atlantic Fisheries	3,885	5,030	5,030
International Whaling Commission	420	420	420
International North Pacific Fisheries Commission	12,837	15,650	15,650
Great Lakes Fishery Commission	815,000	989,100	915,100
Expenses of U. S. Commissioners	10,000	11,250	11,250
Total	1,285,587	1,654,000	1,600,000

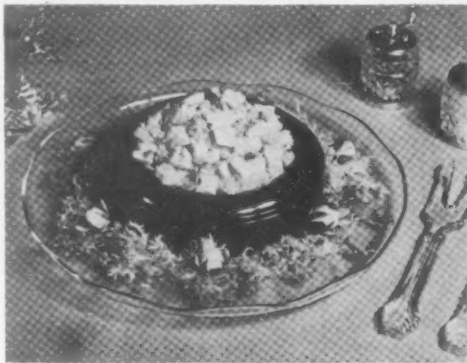
TRADE AGREEMENTS EXTENSION ACT: H. R. 7521 (Dixon) introduced in the House on May 14, a bill to amend the Trade Agreements Extension Act of 1951 with respect to escape clause procedure, and for other purposes; to the Committee on Ways and Means. See *Commercial Fisheries Review*, April 1957, p. 67, for S. 1796 (Watkins). Both H. R. 7521 and S. 1796 provide that the findings of the Tariff Commission in escape clause investigations shall be final unless disapproved by a constitutional majority of either house of Congress within 60 days. The bills would eliminate the President from the escape clause procedure.



HALIBUT IS PLENTIFUL

Halibut is now plentiful because early in May the halibut season opened in the cold waters of the North Pacific Ocean, off the coasts of Washington, British Columbia, and Alaska.

Halibut, taken commercially, range in size from 5 to more than 80 pounds, with a very few as large as 400 pounds. The 5- to 10-pound sizes are referred to as "chicken halibut;" those from 10 to 60 pounds, "mediums;" those from 60 to 80 pounds, "large;" and those over 80 pounds, as "whales."



Halibut Salad Ring.

Halibut is a firm and flavorful fish with white, translucent meat. It may be prepared very successfully by any of the basic cooking methods such as frying, baking, broiling, and steaming.

Even though most of the halibut comes from the Pacific Northwest, halibut is available in all parts of the United States, mainly as frozen steaks. Chunks and fillets of halibut are other forms in which it may be purchased.

Frozen steaks or fillets may be cooked without thawing if additional cooking time is allowed.

Home economists of the United States Fish and Wildlife Service suggest that you take advantage of the abundance of halibut steaks and fillets on the market and serve "Halibut Salad Ring" to your family this summer.

HALIBUT SALAD RING

2 CUPS FLAKED HALIBUT	1 CUP SLIVERED TOASTED ALMONDS
1 CAN (1 LB. 4 OZ.) CRUSHED PINEAPPLE	1 CUP MAYONNAISE OR SALAD DRESSING
2 PACKAGES LIME-FLAVORED GELATIN	1 TEASPOON LEMON JUICE
1 1/2 CUPS BOILING WATER	1/2 TEASPOON SALT
2 CUPS PINEAPPLE JUICE AND WATER	SALAD GREENS
1 TEASPOON SALT	RED RADISHES
1/2 CUP LEMON JUICE	

Drain pineapple and save liquid. Dissolve gelatin in boiling water. Add pineapple juice and water, lemon juice, and salt. Place in a 1-quart ring mold; chill until firm. Combine almonds, mayonnaise, lemon juice, salt, pineapple, and fish. Chill. Unmold gelatin on salad greens and fill center with fish mixture. Garnish with radishes. Serves 6.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES
In Millions of Pounds

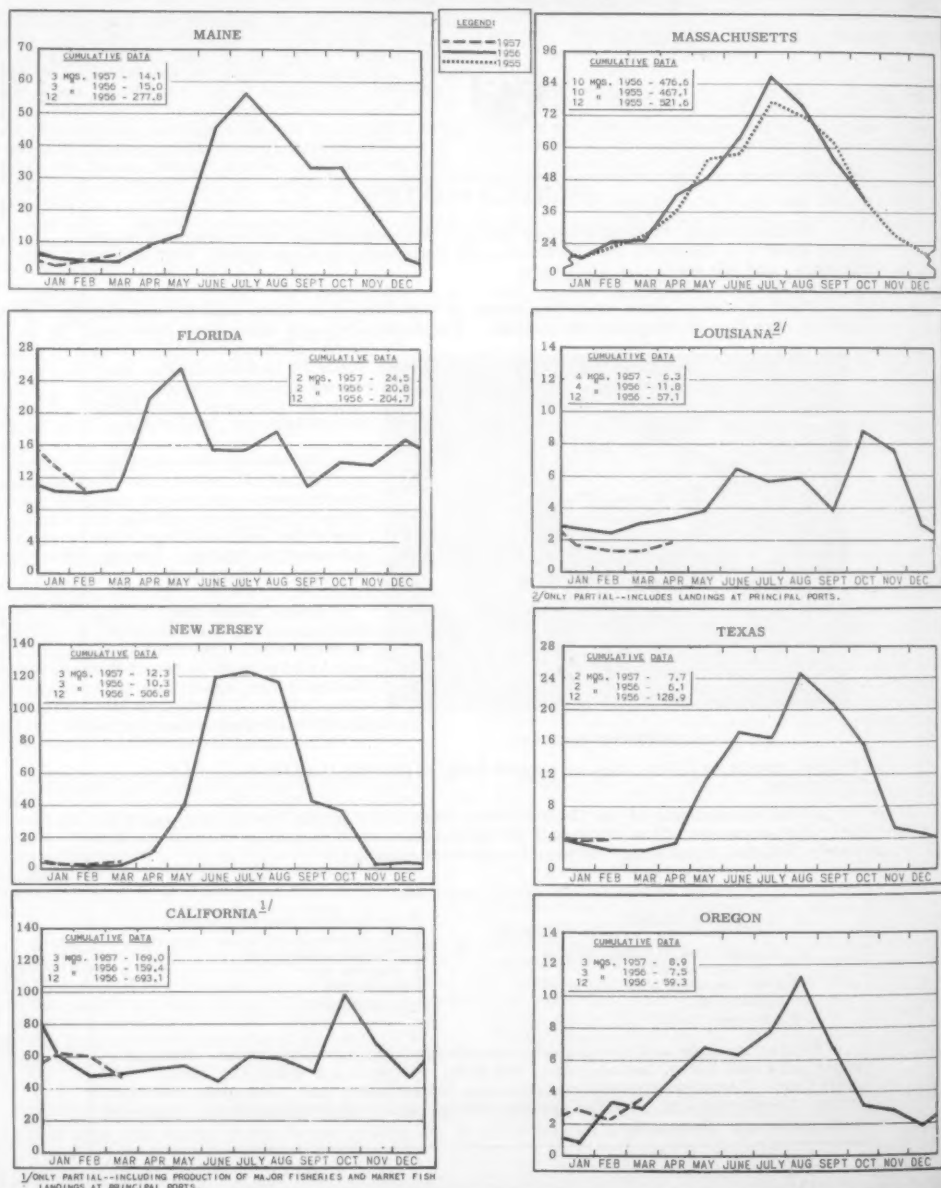
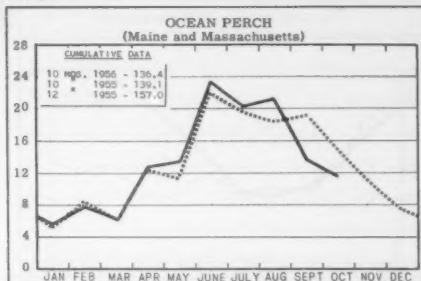
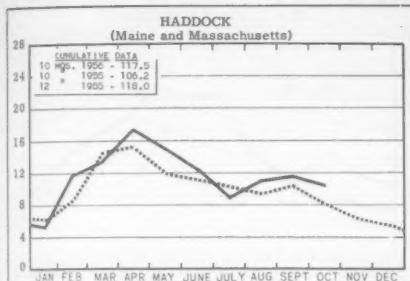
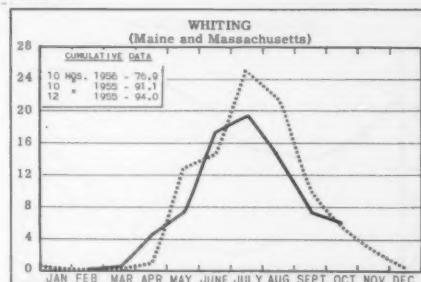
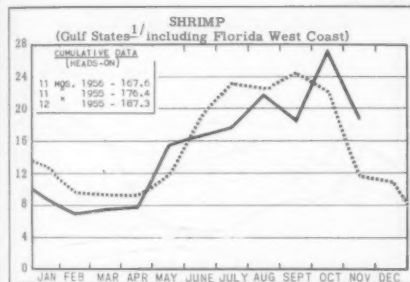


CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

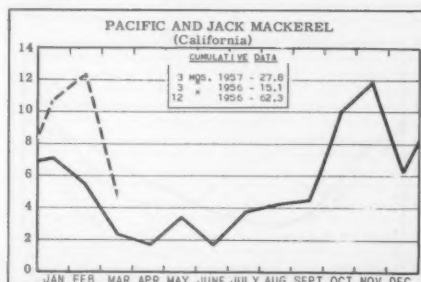
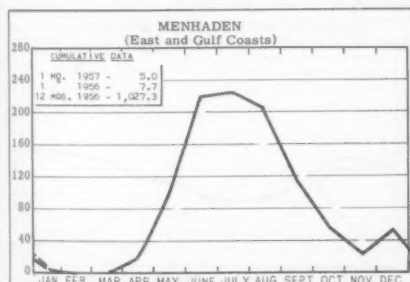


In Millions of Pounds

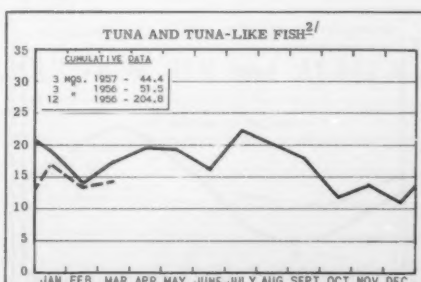
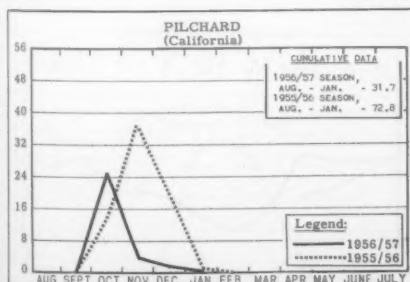


^{1/}LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



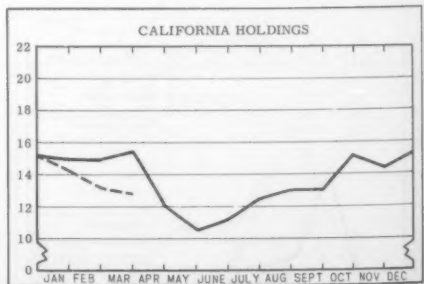
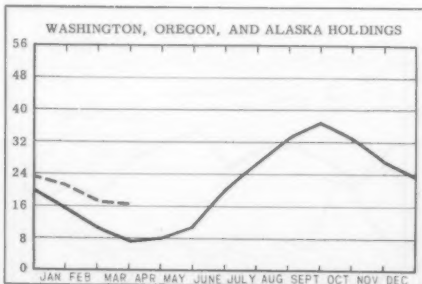
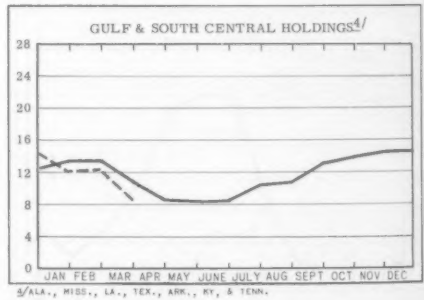
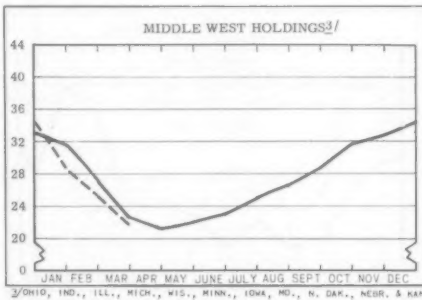
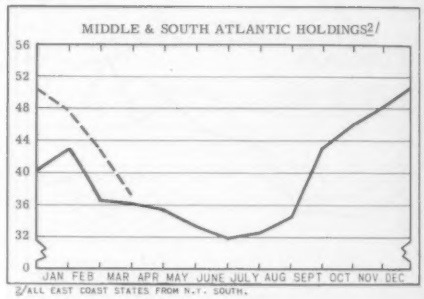
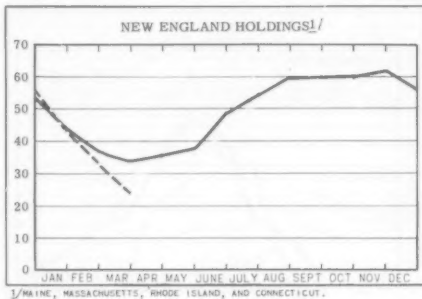
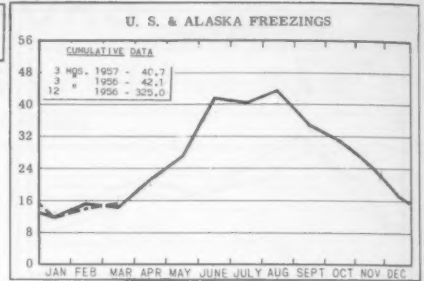
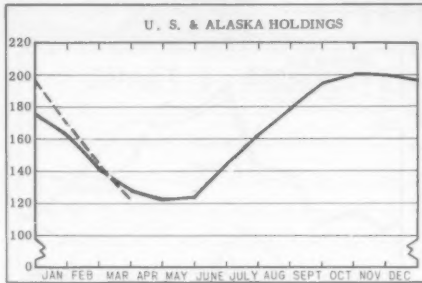
In Thousands of Tons



^{2/}RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

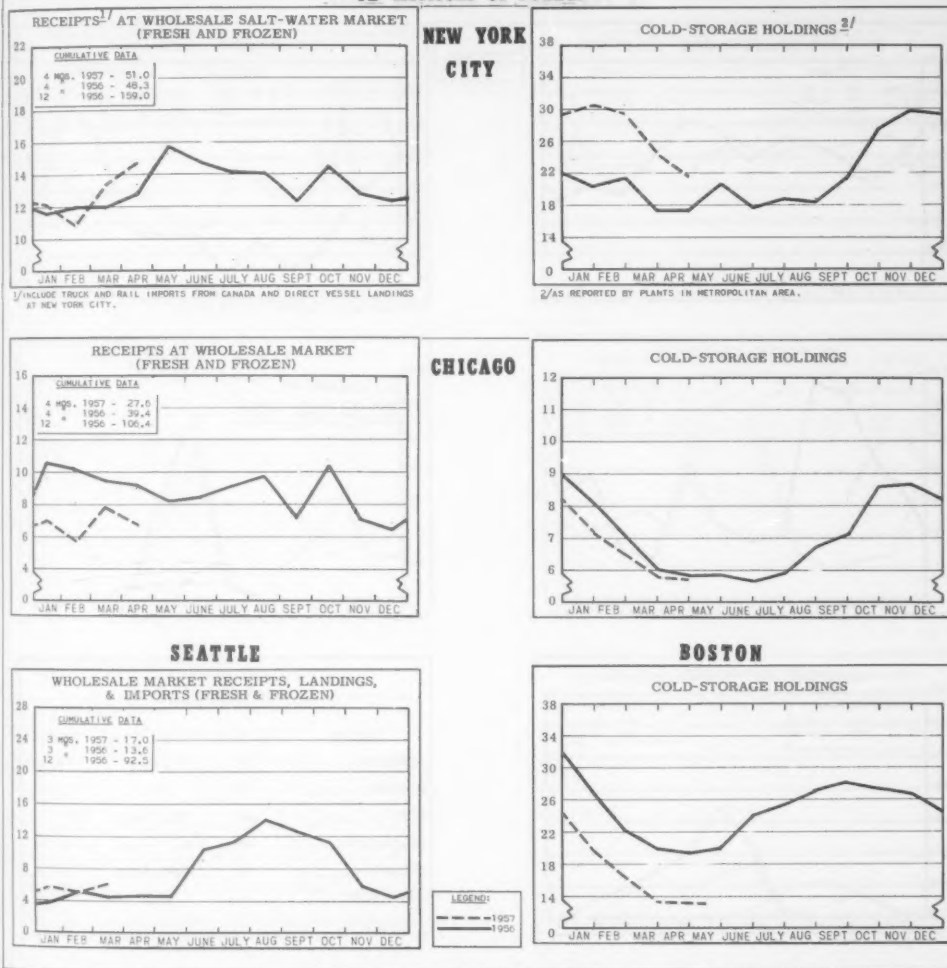


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

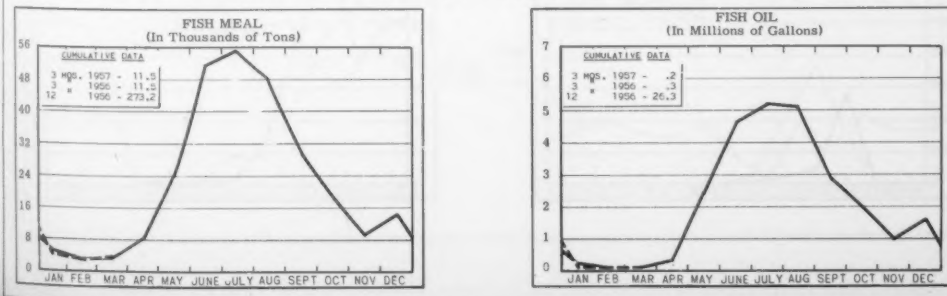
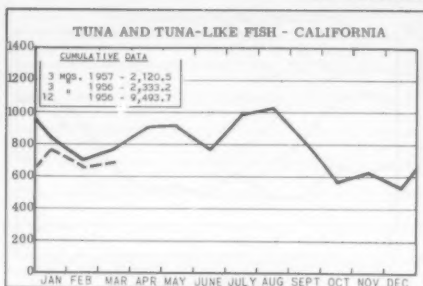
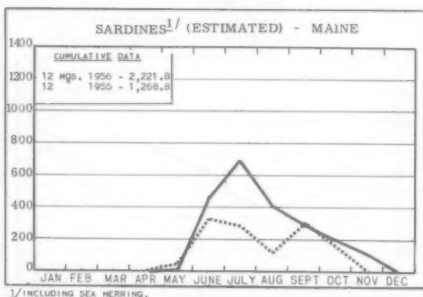
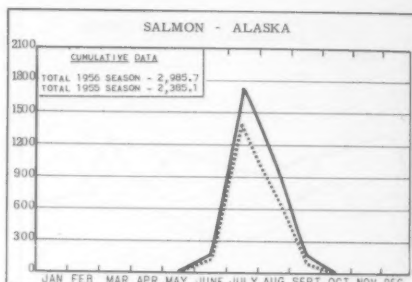
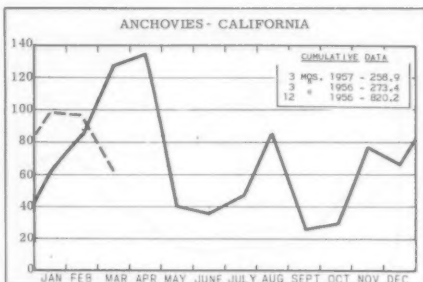
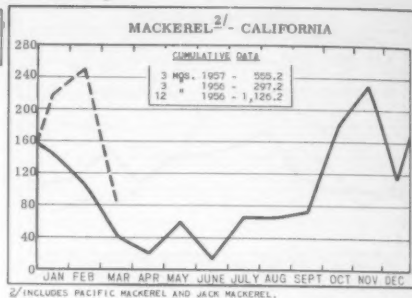


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases

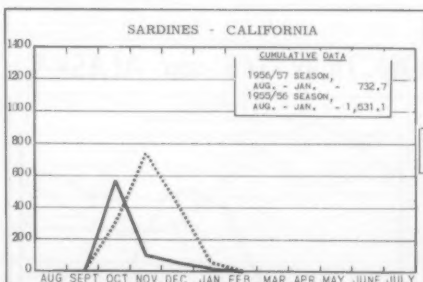


LEGEND:
--- 1957
— 1956



STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP	48	--	5 oz.
TUNA	48	No. $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	$\frac{1}{2}$ lb.	8 oz.



Legend:
— 1956/57
----- 1955/56

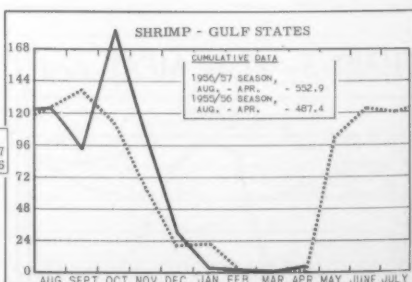
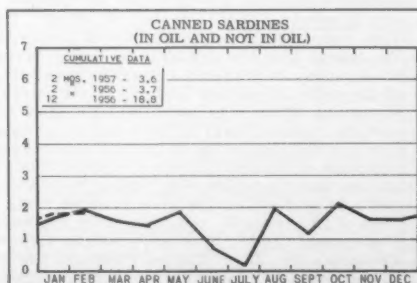
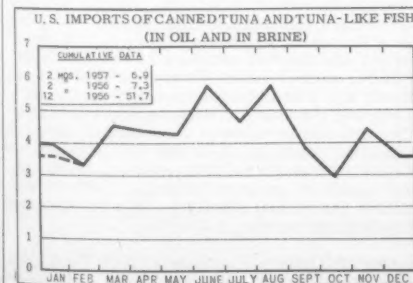
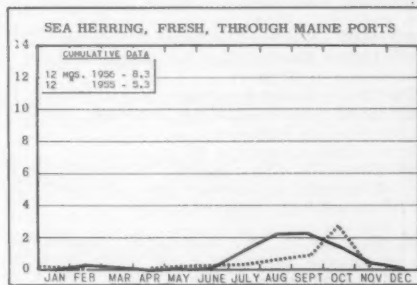
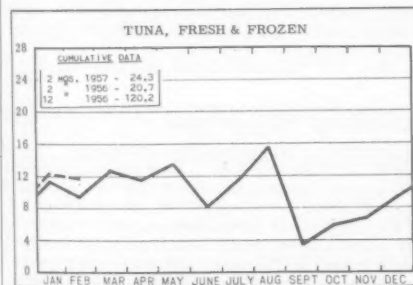
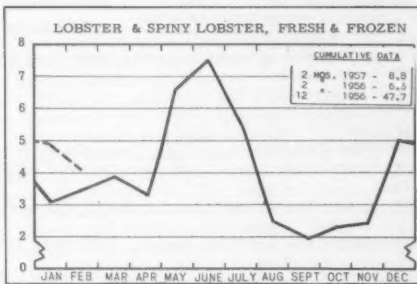
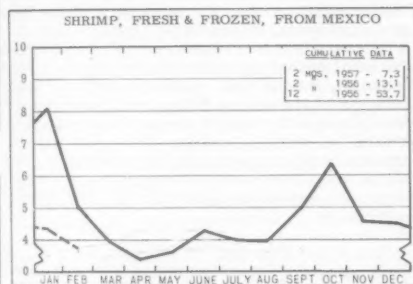
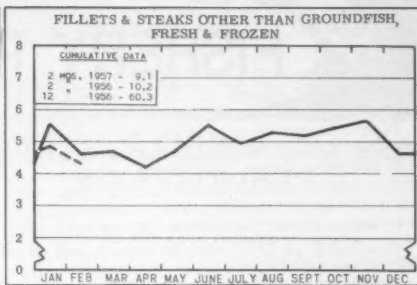
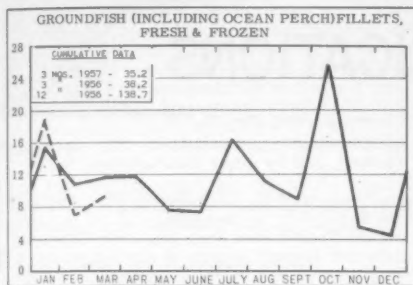
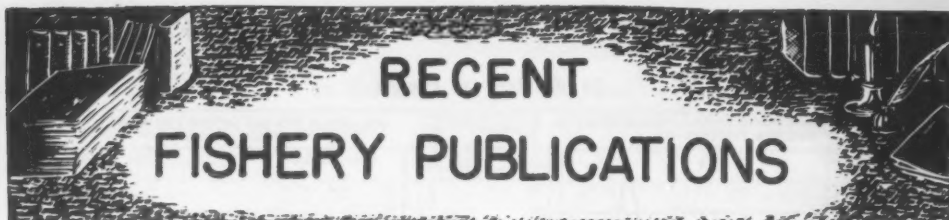


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U.S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
SSR - FISH-SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SSR - WILDLIFE-SPECIAL SCIENTIFIC REPORTS--WILDLIFE (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-1495	- Florida Landings, December 1956, 6 pp.
CFS-1496	- California Landings, October 1956, 4 pp.
CFS-1500	- North Carolina Landings, January 1957, 2 pp.
CFS-1502	- Frozen Fish Report, February 1957, 8 pp.
CFS-1504	- New Jersey Landings, January 1957, 4 pp.
CFS-1507	- Alabama Landings, December 1956, 2 pp.
CFS-1508	- Shrimp Landings, November 1956, 4 pp.
CFS-1509	- Rhode Island Landings, January 1957, 3 pp.
CFS-1511	- Maine Landings, January 1957, 3 pp.
CFS-1516	- South Carolina Landings, January 1957, 2 pp.

SSR-Fish. No. 199 - Gulf-II Semiautomatic Plankton Sampler for Inboard Use, by Albert Collier, 15 pp., illus., February 1957.

SSR-Wildlife No. 35 - Summary of Sportsmen's Expenditures, Missouri River Basin, by A. J. Nicholson, 19 pp., March 1957.

Household Consumer Preferences for Canned Fishery Products, 1956, Circular 45, 48 pp., illus. This report deals with a survey of preferences for canned fish and shellfish in United States households. It presents a graphic version of some of the more important findings of the survey. The survey on which it is based was designed to assist the commercial fishing industry in obtaining a better understanding of factors affecting consumption of canned fishery products. Such factors as consumer preferences, buying practices, and methods of distribution were studied. This is the first of two reports resulting from the survey. The second report, Special Scientific Report: Fisheries No. 200, "Canned Fish and Shellfish Preferences of Household Consumers, 1956," provides more detailed data as to the information supplied by the households analyzed nationally

and regionally, as well as by city size, income classes, and by other characteristics.

Annual Report of the Director of Fish and Wildlife Service to the Secretary of the Interior, Fiscal Year Ended June 30, 1956 (Reprinted from the Annual Report of the Secretary of the Interior), 30 pp., printed. Summarizes the various activities of the Service. Specifically discussed are: assistance to the commercial fisheries (describes the activities of the Branch of Commercial Fisheries); conservation of Alaska commercial fisheries; Pribilof Islands fur-seal industry; research in fishery biology (coastal, inland, and marine fisheries); maintenance of the inland fisheries; river basin development and wildlife needs; Federal aid to states for the restoration of fish and wildlife; international cooperation in conservation (international technical cooperation and international conservation agreements); and other activities.

Sep. No. 473 - Iron Sulfide Discoloration of Tuna Cans, No. 6 - Experiments to Elucidate Mechanism of the Reaction.

Sep. No. 474 - An Experimental Air-Pressure Depth-Meter for Use with Midwater Trawls.

Sep. No. 475 - Pacific Coast Fishing Ports.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Halibut Market Developments at Chicago, 1954-55, by G. A. Albano, 6 pp., processed. (Available free from the Market News Service, U.S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Observations on the importance of halibut in the fresh and frozen fishery products trade in Chicago. The author discusses marketing and its significance, International Pacific Halibut Commission and the 1957 North Pacific Halibut Regulations, distribution centers for frozen halibut, Chicago market background as a receiving and distribution center, and receipts and market supplies in relation to the Pacific halibut catch. Tables present data on fresh and frozen halibut receipts at Chicago, 1950-56; fresh and frozen halibut receipts at Chicago compared with total United States and Canadian landings, 1950-56; United States and Canadian Pacific halibut landings, freezings, and month of greatest holdings, 1950-56; and United States and Alaska halibut freezings and holdings by months, 1952-56.

Receipts of Fishery Products at New York City, 1947, by Henry M. Bearse, 14 pp., processed. (Available free from the Market News Service, U.S. Fish and Wildlife Service, 155 John St.,

New York 38, N.Y.) Contains an analysis of fishery products receipts for 1947 and marketing trends at New York City. The author discusses in the first part of this report the receipts of fresh and frozen fish and shellfish; receipts by species; vessel landings at New York; receipts by area; fresh-water market receipts; imports into the New York City Customs District; and trends in methods of transportation. The tables, in the second part of this report, present data on receipts of fish and shellfish in the salt-water section of Fulton Market by months and method of transportation, by species and method of transportation, and by states and provinces of origin.

Seattle and Astoria Landings, Receipts, and Value

of Fishery Products, 1956, by Charles M. Reardon, 41 pp., processed, 1957. (Available free from the Market News Service, 421 Bell Street Terminal, Seattle 1, Wash.) The Pacific Northwest fisheries trends and their effect upon Seattle fishery products receipts for 1956 are discussed in the first part of this report. This section covers total receipts of fishery products at Seattle; sources of supply of frozen and fresh fishery products; trends in Seattle receipts of salmon, halibut, tuna, otter-trawl and long-line landings, shellfish, herring meal, and other miscellaneous fishery products and byproducts. The tables present fishery landings and wholesale receipts (including approximate values) at Seattle for 1956 by species, source of origin, and by months; monthly index of receipts of certain fishery products at Seattle; carload shipments of fishery products from Seattle by months; and names, classifications, and approximate standards for fresh and frozen fishery products sold on the Seattle market. The Astoria section includes a discussion of fisheries trends and fishery products receipts at Astoria, Oregon, for 1956. This section covers the Columbia River gill-net fishery, troll and otter-trawl fisheries, and landings and wholesale receipts of fishery products at Astoria during 1956.

California Fishery Products Monthly Summary,

February 1957, 10 pp. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of raw tuna and tunalike fish, herring, mackerel, anchovies, and squid; pack of canned tuna, herring, mackerel, anchovies, and squid; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen fish prices; for the month indicated.

Gulf Monthly Landings, Production, and Shipments

of Fishery Products, March 1957, 5 pp. (Market News Service, U.S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Monthly Summary of Fishery Products Production

in Selected Areas of Virginia, North Carolina, and Maryland, March 1957, 4 pp. (Market News Service, U.S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower

Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Fishery Statistics of the United States, 1954, by

A. W. Anderson and E. A. Power, Statistical Digest No. 39, 387 pp., illus., printed, \$1.75, 1956. This is the latest in a series of annual statistical reports on the fisheries of the United States, Alaska, and Hawaii, which contains data on the catch and ex-vessel value of fishery products, employment in the fisheries, quantity of gear operated, the number of fishing craft employed in the capture of fishery products, and certain information on the production and value of manufactured fishery products and byproducts. The statistical surveys conducted during 1955 for 1954 data covered all sections of the United States. The catch of fishery products in all sections of the United States and Alaska during 1954 totaled approximately 4.7 billion pounds valued at \$355.6 million ex-vessel—an increase of 6 percent in quantity and 1 percent in value as compared with 1953. Menhaden landings continued to climb and soared above 1.7 billion pounds to establish a new record. Shrimp was again the most valuable single item taken by domestic fishermen. The catch of these shellfish totaled a record 268 million pounds valued at nearly \$61 million ex-vessel. The average price-per-pound paid to fishermen for shrimp during 1954 amounted to 23 cents as compared with 29 cents in 1953. The shrimp industry in the major producing areas suffered severe problems during the year resulting from an oversupply of shrimp, sharply declining prices, and increased operating and labor costs. Several of the major foodfish recorded noteworthy gains during the year: cod (up 12 million pounds); croaker (up 24 million pounds); haddock (up 15 million pounds); halibut (up 14 million pounds); Pacific mackerel (up 18 million pounds); Atlantic ocean perch (up 28 million pounds); Pacific sardines (up 127 million pounds); salmon (up 12 million pounds); and Pacific tuna (up 20 million pounds). Despite a gain, the 1954 catch of cod was, with the exception of the low 1953 catch, the smallest for any year for which records are available. Ocean perch, which for the past 20 years has supported one of the major segments of the New England fishing industry, rallied noticeably during 1954 with a yield of 181 million pounds. To maintain the landings of ocean perch it has been necessary for the fleet to fish farther and farther to the eastward and in recent years there has been a greater percentage of the catch of ocean perch coming from the Gulf of St. Lawrence and off Newfoundland. The 137-million-pound Pacific sardine catch during the year was heartening to both packers and conservationists alike. The total Pacific Coast catch of salmon amounted to 325 million pounds as compared with 313 million pounds in 1953. The production of chum salmon in Alaska was the largest in many years and there was a spectacular increase in the run of sockeye salmon in Puget Sound waters en route to the

rehabilitated Fraser River. The pack of canned fishery products in the United States, Alaska, Hawaii, Puerto Rico, and American Samoa in 1954 amounted to nearly 863 million pounds valued at \$331 million to the packers. Increased packs of tuna, Maine and Pacific sardines, salmon, and fish packed for pet food were responsible for the gain in pack. The fish stick industry continued to expand during 1954 with a production of 50 million pounds reported for the year. In 1953, the total production amounted to 7.5 million pounds. The 1954 output averaged over 4 million pounds of sticks a month. Toward the end of the year, output was accelerated and in the last quarter, the manufacture of sticks averaged over 5 million pounds a month. The sticks were manufactured from both imported and domestic fish with a majority of the production coming from imported cod. Fishery statistics of the United States and Alaska are compiled and published annually to make available information on both the economic and biological aspects of the domestic commercial fisheries. Data on the economic aspects are necessary to persons engaged in the commercial fishery and to governmental agencies concerned with its regulation and protection. From the biological standpoint these data are important to sound fishery management in providing detailed information on fluctuations in the commercial catch by species, locality, and gear, and type of craft operated. They assist conservation agencies in regulating the commercial fisheries so as to produce maximum yields without depletion.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AFRICA:

A Revision of the Lake Victoria HAPLOCHROMIS Species (Pisces, Cichlidae), Part I: H. OBLIQUIDENS Hilgendorf, H. NIGRICANS (Bigr.), H. NUCHISQUAMULATUS (Hilgendorf) and H. LIVIDUS Sp. N., by P. H. Greenwood, 22 pp., illus., printed. (Reprinted from Bulletin of the British Museum--Natural History--Zoology, vol. 4, no. 5, London, 1956.) East African Fisheries Research Organization, Jinja, Uganda.

ALGAE:

"Connective Tissue Growth Stimulated by Carageenin--2. The Metabolism of Sulphated Polysaccharides," by H.G.B. Slack, article, The Biochemical Journal, vol. 65, no. 3, March 1957, pp. 459-464, illus., printed. Cambridge University Press, American Branch, 32 East 57th St., New York 22, N. Y.

BRITISH GUIANA:

Report on British Guiana for the Year 1955, 234 pp. and map, illus., printed. B.G. Lithographic Co., Ltd., Georgetown, British Guiana. A useful source of ready reference material on economic and social activities of the British Guiana government. The section on fisheries describes the principal fishing areas and fishing methods and

efforts to improve production. Statistics are given also on the quantity and value of the catch of fishery products during 1955.

COD:

"New Cod Grounds for Longliners," article, Trade News, vol. 9, no. 8, February 1957, pp. 3-8, illus., printed. Department of Fisheries, Ottawa, Canada. (Readers wishing to obtain Bulletin No. 109 of the Fisheries Research Board of Canada from which the information in this article is extracted should address their requests to The Queen's Printer, Ottawa, Canada. For each copy desired a remittance of 50 Canadian cents made payable to the Receiver General of Canada should be enclosed.) Deals with long-lining experiments carried out in the Bonavista, Newfoundland, area during the years 1950-1953 and the discovery of new fishing grounds. Some excellent cod-fishing grounds were found in the deep water to the eastward of the underwater projection of the Bonavista Peninsula, 18 to 20 nautical miles offshore, in about 130 to 160 fathoms. To determine the potential of the newly discovered fishing grounds, the 1951 long-lining experiments off Bonavista were planned along commercial lines. Results of these and other experiments are discussed. The discovery of these new fishing grounds has opened up for exploitation a great population of abundant large cod. These large deep-water fish are much better raw material than are the smaller fish for salt-fish operations, for smoking, and for some fresh fish purposes.

COMMISSIONS:

Gulf States Marine Fisheries Commission Seventh Annual Report, 1955-56 (to the Congress of the United States and to the Governors and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 37 pp., illus., printed. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans 16, La. Contains the Commission's activities for the period October 1955-October 1956, with a summary of some of the points of general interest in the compact between the States of Alabama, Florida, Louisiana, Mississippi, and Texas. It is the purpose of the compact to promote the better utilization of the fisheries, marine, shell and anadromous, of the seaboard of the Gulf coast states, by the development of a joint program for the promotion and protection of such fisheries and the prevention of the physical waste of the fisheries from any cause. This report briefly enumerates some of the activities and presents in summary the accomplishments of those agencies with which the organization is directly associated. Also included are short discussions of the U.S. Fish and Wildlife Service activities in technological and biological research and exploratory fishing in the Gulf area. A financial report of the Commission is included.

(International Commission for the Northwest Atlantic Fisheries) Statistical Bulletin for the Year 1955, 52 pp., illus., printed. International Commission for the Northwest Atlantic Fisheries, N.S., Canada, 1957. This bulletin is divided into two parts as follows: Part 1 summarizes the statistics on landings of the past four years, and Part 2 gives the tables of statistics dealing with the fisheries in the Convention Area in 1955. Following the recommendation of the

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Standing Committee on Research and Statistics, the presentation of the basic statistical data has been revised to place greater emphasis on area and month of fishing. It includes all the basic statistics for 1955 on fishing effort and on the landings of cod, haddock, redfish, halibut, the flounder group, and the other groundfish group that were reported according to the Commission's statistical requirements. Previously these basic statistics were tabulated separately for each country. Now they have been combined in one international table. However, a summary of the national statistics is given, including certain supplementary information which was reported by the member countries.

COMPOSITION:

"Tabellen der Chemischen Zusammensetzung von Fischen--I. Vitamine," (Tables of the Chemical Composition of Fish--I. Vitamins) by J. Kuhnau, article, Arch. Fischereiwiss., vol. 7, no. 1, 1956, 28 pp., printed in German. Archiv fur Fischereiwissenschaft, Gustav Wenzel & Sohn, H. Heenemann KG, Berlin-Wilmersdorf Braunschweig, Germany.

CORMORANTS:

"Fishing with Cormorants," by Robert Bruce White, article, Nature Magazine, vol. 49, no. 10, December 1956, pp. 525-527, 547, illus., printed, single copy 60 cents. A brief description of fishing with cormorants by the Chinese and Japanese. In recent years fishing with cormorants has become a tourist attraction.

CRAB MEAT:

"A Rapid Method for Determining Shell in Crab Meat under Ordinary Light," by M. Oakley and A. W. Breidenbach, article, Journal of the Association of Official Agricultural Chemists, vol. 39, 1956, pp. 531-532, printed. Association of Official Agricultural Chemists, Inc., Box 540, Benjamin Franklin Station, Washington, D. C. The incidence of shell in 1-pound samples of retail crab meat was observed; the amount of shell varied from 0 to 350 pieces a pound. A method is described for staining the shell fragments so that they may be removed and counted quickly.

CRAWFISH:

"Crawfishing Time," by William M. Hall, article, Nature Magazine, vol. 50, no. 3, March 1957, pp. 124-126, illus., printed, single copy 60 cents. American Nature Association, 1214-16th St. NW, Washington 6, D. C. Describes briefly the life history and habits of the crawfish, as it is known in Louisiana. The crawfish, a lobster-like crustacean, is a fresh-water inhabitant living mostly in shallow streams and lowlands. Crawfishing is a popular sport in Louisiana and an important commercial item.

DEHYDRATION:

"Fish Dehydration--A Warm Air Process," article, Food Manufacture, vol. 31, August 1956, pp. 326-329, illus., printed. Leonard Hill Ltd., Stratford House, 9 Eden, London N.W. 1, England.

DELAWARE:

Annual Report of the Delaware Commission of Shell Fisheries of the State of Delaware for the

Fiscal Year July 1, 1955 to June 30, 1956, 6 pp., processed. The Delaware Commission of Shell Fisheries, Dover, Del., 1956.

EAST AFRICA:

Preliminary Survey of the Pelagic Fishes of East Africa, by F. Williams, Colonial Office Fishery Publications No. 8, 70 pp., illus., printed, 15s. 6d. (US\$2.16). Her Majesty's Stationery Office, London, England, 1956.

FOOD AND AGRICULTURE ORGANIZATION:

Argentina: Decree No. 7,967 amending Article 91 of the Food Regulations, Food and Agricultural Legislation, vol. 5, no. 3, XVII.2/56.1, 2 pp., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.) An amendment permitting the sale of raw fish in fillets or pieces providing that the fish has been kept chilled and is prepared under official inspection.

Canada: Fishing Vessel Indemnity Regulations under the Appropriation Act No. 5 of 1955 and Appropriation Act No. 6 of 1956 (SOR/56-304--Order in Council 1956-1291), Food and Agricultural Legislation, vol. 5, no. 3, XVIII.3/56.1, 9 pp., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.)

Union of South Africa (South-West Africa): Food, Drugs and Disinfectants Regulations made under the Food, Drugs and Disinfectants Ordinance No. 36 of 1952, Food and Agricultural Legislation, vol. 5, no. 3, XI.9/56.2, 43 pp., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.) Includes, among others, regulations on the quality, labeling, and standards of canned fish and shellfish.

FRANCE:

Bulletin Officiel d'Information du Conseil Supérieur de la Pêche (Official Information Bulletin of the High Council of Fisheries), 114 pp., printed, 100 francs (29 U.S. cents). H. Siraud & Compagnie, 6 place de la Visitation, Angers - C./C. Paris 4012-03. Contains the following sections: I--Activities of the High Council of Fisheries; II--Technical Section (e.g. Restocking of Pike); III--Official Documentation; IV--Judicial Section; V--Regional Section; and VI--Miscellaneous Information.

Manuel du Poissonnier (A Manual for Fish Dealers), 282 pp., illus., printed, 1,000 francs (US\$2.86). National Committee for the Promotion of Consumption of Fish, 11 rue Anatole de la Forge, Paris XVII, France. A compilation of articles by various qualified authors dealing with the technical and general phases of fish wholesaling and retailing. A number of colored plates illustrating different species of commercially-important edible fish are present as well as numerous tables, graphs, and photographs relating to

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commercial fish distribution. Some of the individual subjects are: the fish dealer and his store; purchases and sales; description of 35 currently consumed fish and how they are caught; byproducts of the fishing industry and their use; fishing ports; land transportation of fishery products; and laws and regulations connected with fish dealership.

--R. Duckworth

FREEZING:

"Freezing Fish in Alginate Jelly," by I. A. Olsen, article, Food Manufacture, vol. 30, 1955, pp. 267-270, 285, printed. Food Manufacture, Leonard Hill Ltd., 17 Stratford Pl., London, W.1, England.

"Frysning af Krebsdyr" (Freezing of Crustaceans), by E. W. Hansen, article, Kulde, vol. 9, 1955, pp. 18-20, printed in Danish. Dansk Køltekisk Tidsskrift, Copenhagen, Denmark.

GENERAL:

Chlorophyll a in the Phytoplankton in Coastal Waters of the Eastern Gulf of Mexico, by Nelson Marshall, Contribution No. 29, 19 pp., illus., printed. (Reprinted from Sears Foundation: Journal of Marine Research, vol. 15, no. 1, October 15, 1956, pp. 14-32.) Oceanographic Institute, Florida State University, Tallahassee, Fla.

The Galathea Deep Sea Expedition, 1950-52, by Anton F. Bruun, Sv. Greve, Hakon Mielche, and Ragnar Sparck, Eds., translated from Danish by Reginald Spink, 296 pp., illus., printed, \$8. The Macmillan Co., 60 Fifth Ave., New York 11, N.Y. The story of a marine-biological world expedition told by the scientists themselves, describing the wonders they found on a trip around the world to all the Seven Seas.

GULF OF MEXICO:

"Some Observations on the Behaviour of Schools of Fishes in the Gulf of Mexico and Adjacent Waters," by Stewart Springer, article, Ecology, vol. 38, no. 1, January 1957, pp. 166-171, printed. Duke University Press, Box 6697, College Station, Durham, N.C.

HERRING:

Herring Rearing--III. The Effect of Temperature and other Factors on Myotome Counts, by J.H.S. Blaxter, Scottish Home Department Marine Research No. 1, 19 pp., illus., printed, 4s. (56 U.S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland, 1957.

HONG KONG:

Hong Kong Annual Departmental Report by the Registrar of Co-Operative Societies and Director of Marketing for the Financial Year 1955-56, 50 pp., illus., printed. Government Printer, Java Road, Hong Kong. This report covers the activities of the Department from April 1, 1955, to March 31, 1956. The Cooperative Division section discusses the activities of the Fish Pond Society; Fishermen's Thrift Societies; Fishermen's Thrift and Loan Societies; Fishermen's Thrift, Loan and Housing Society; and Fishermen's Credit and Marketing Society. Section III discusses credit facilities for fishermen. Among the subjects discussed in the Marketing Division

section are: establishment of the Fish and Vegetable Marketing Organization, wholesale prices of fresh and salt-dried fish, quantity and value of fish marketed, education, and related subjects.

KENTUCKY:

Results of an Opening Week Creel Census and Tagging Study on Three State-Owned Lakes, by Charles C. Bowers and Mayo Martin, Fisheries Bulletin No. 20, 13 pp., illus., processed. Department of Fish and Wildlife Resources, Frankfort, Ky., October 1956.

KOREA:

Export Directory of Korea, 1957, 110 pp., illus., printed. Ministry of Commerce and Industry, Seoul, Korea. This directory describes and illustrates all items produced in Korea which are available for export. In addition to the listing and description of export commodities, it contains a description of export procedures and policies and lists of trade associations, exporters, and manufacturers. Among the exportable commodities listed are the following fish and related items: dried abalone, agar-agar, live and fresh fish, salted fish, shark-liver oil, dried oysters, pearl essence, seasoned sea urchins, seaweed, shark fins, shells for buttons, dried shrimp, and dried trepang.

LOBSTER:

"The Lobster," by E. B. Dewberry, article, Food Manufacture, vol. 29, 1954, pp. 353-357, 391-395, printed. Food Manufacture, Leonard Hill Ltd., 17 Stratford Pl., London, W.1, England. A description of the distribution, food value, habits and life history, fishing season, and temporary storage of the live lobster. An account is also given of the lobster canning industry in Canada and South Africa, and of processing and packing operations involved.

NAVIGATION:

The Mariner's Weather Log, vol. 1, no. 1, January 1957, 20 pp., illus., processed. Weather Bureau, U.S. Department of Commerce, Washington 25, D.C. This is the first issue of The Mariner's Weather Log, a bimonthly publication providing information on weather over the oceans and the Great Lakes. This issue includes reports on meteorological and oceanographic navigation; smooth log, North Atlantic Weather, July, August, 1956; rough log, North Atlantic Weather, September-November, 1956; gale tables, and marine weather diary. It also includes the following articles: "Hurricane Frequencies," by William H. Haggard; and "North Atlantic Tropical Storms, 1956," by Howard C. Sumner.

Supplement to United States Coast Pilot 2, Atlantic Coast, Section B, Cape Cod to Sandy Hook, Fifth (April 1, 1950) Edition, Serial 736/7, 89 pp., printed, February 9, 1957; Supplement to United States Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, Sixth (June 6, 1953) Edition, Serial 770/4, 42 pp., printed, February 2, 1957; and Supplement to United States Coast Pilot 4, Atlantic Coast, Section D, Cape Henry to Key West, Fifth (May 15, 1948) Edition, Serial 715/9, 98 pp., printed, February 9, 1957. Coast and Geodetic

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Survey, U. S. Department of Commerce, Washington 25, D. C.

NORTHEAST PACIFIC:

"Climatic Trends and Fluctuations in Yield of Marine Fisheries of the Northeast Pacific," by K. S. Ketchen, article, Journal of the Fisheries Research Board of Canada, vol. 13, no. 3, May 1956, pp. 357-374, illus., printed. Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B.C., Canada.

NORWAY:

Årsmelding 1955 fra Fiskeridirektoratets Kjemisk-Teknisk Forskningsinstitut (1955 Annual Report from the Fishery Directorate of the Chemical-Technological Research Institute), no. 3, 51 pp., illus., printed in Norwegian. Kjemisk-Tekniske Forskningsinstitut, Bergen, Norway, 1957.

OYSTER:

The Crown Conch, MELONGENA CORONA, as a Predator upon the Virginia Oyster, by Gordon Gunter and R. Winston Menzel, 4 pp., printed. (Reprinted from The Nautilus, vol. 70, no. 3, January 1957, pp. 84-87.) Gulf Coast Research Laboratory, Ocean Springs, Miss.; or Oceanographic Institute, Florida State University, Tallahassee, Fla.

POLLUTION:

Pollution Studies in Biscayne Bay during 1956, by J. Kneeland McNulty, Progress Report 57-8, 27 pp., illus., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., February 1957.

PRESERVATION:

"Badania nad Wplywem Lodu Azotynowanego na Trwalosc i Jakosc Dorsza Baltickiego" (Studies on the Influence of Nitrite-Treated Ice on the Storage Life and Quality of Baltic Haddock), by J. Borowik, E. Fischer, S. Ostrowski, and P. Trzesinski, article, Przem. Spozyw., vol. 10, 1956, pp. 282-283, printed in Polish with summary in English. Przemysl Spozywczy (Food Industry), Czackiego 3/5, NOT, pok. 29 c, Warsaw, Poland.

"Beitrage zur Methodik der Konservierungsmittebestimmung in Fischindustriellen Erzeugnissen. II. Über Bestimmung, Verteilung und Verbleib von Konservierungsmitteln in Fischindustriellen Erzeugnissen" (Contribution to Methods for the Determination of Preservatives in Commercial Fish Products. II. Determination, Distribution and Retention of Preservatives in Commercial Fish Products), by R. Hutschenreuter, article, Zeitschrift für Lebensmitteluntersuchung und -Forschung, vol. 104, 1956, pp. 161-168, printed in German. Zeitschrift für Lebensmitteluntersuchung und -Forschung, Berlin, Germany.

"Effectiveness of Chlorotetracycline (Aureomycin) on Keeping Quality of Pacific Round Herring, Etrumeus micropus," by Tetuo Tomiyama, Shunichi Kuroki, Denki Maeda, Moriji Hamada, and Akira Honda, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 2, 1956, pp. 120-127, printed in Japanese with

summary in English. The Japanese Society of Scientific Fisheries, Tokyo, Japan.

"Effectiveness of Chlorotetracycline on Keeping Quality of Several Bottom Fish," by Tetuo Tomiyama, Yasuo Yone, Shunichi Kuroki, Minoru Nomura, Shotaro Hara, Tetu Schichizi, Toshihiro Maeda, Ichiro Oda, and Toshio Matsuo, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 2, 1956, pp. 128-135, printed in Japanese with summary in English. The Japanese Society of Scientific Fisheries, Tokyo, Japan.

SALMON:

"Atlantic Salmon Tagged in East Coast Newfoundland Waters at Bonavista," by A.A. Blair, article, Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March 1956, illus., printed. Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B.C., Canada. Describes methods of tagging salmon and grilse and reports the proportion recaptured and the distribution and movements of recaptures.

Leeper: The Story of an Atlantic Salmon, by Robert M. McClung, 64 pp., illus., printed, \$2.25. William Morrow & Co., 425 Fourth Ave., New York 16, N.Y. A story for children of the life cycle of a salmon from his hatching from a pale pink egg to his return to his birthplace to fertilize another generation of salmon eggs.

A Review of the Literature on the Biology of the Atlantic Salmon (SALMO SALAR Linn.), by K.A. Pyefinch, Freshwater and Salmon Fisheries Research Report No. 9, 24 pp., printed. Her Majesty's Stationery Office, Scottish Home Department, 13a Castle Street, Edinburgh, 2, Scotland.

"A Survey of the 1955 Scarcity," condensation of an address by Dr. C.J. Kerswill, The Atlantic Salmon Journal, no. 1, February 1956, pp. 23-24, illus., printed. The Atlantic Salmon Association, 1559 McGregor St., Montreal 25, Canada.

SEA TROUT:

"The Weakfish (Cynoscion regalis) in New York Waters," by Alfred Perlmutter, William S. Miller, and John C. Poole, article, New York Fish and Game Journal, vol. 3, no. 1, January 1956, pp. 1-43, illus., printed. New York Conservation Department, Albany 1, N.Y. Reports on a study to determine the cause of the scarcity of weakfish or gray sea trout in New York waters. The study revealed that a decrease in southern-spawned stock has caused the scarcity and that a means of increasing the stock must be found to produce an abundant supply of weakfish.

STARFISH:

"Intensity of Setting of Starfish in Long Island Sound in Relation to Fluctuations of the Stock of Adult Starfish and in the Setting of Oysters," by Martin D. Burkenroad, article, Ecology, vol. 38, no. 1, January 1957, pp. 164-165, printed. Duke University Press, Box 6697, College Station, Durham, N. C.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

TERRITORIAL WATERS:

(International Law Commission) Report of the International Law Commission on the Work of its Eighth Session: (a) Final Report on the Regime of the High Seas, the Regime of the Territorial Sea and Related Problems. Agenda item 53 (a) (XI). Australia, Brazil, Ceylon, Cuba, Denmark, Dominican Republic, France, Greece, Guatemala, Netherlands, New Zealand, Norway, Pakistan, Panama, Philippines, Portugal, Spain, Sweden, Thailand, United Kingdom, United States, and Uruguay. United Nations, International Law Commission, New York, N. Y. The following processed reports have been issued for limited distribution:

- A/C.6/L.385/Rev. 1, 3 pp., December 19, 1956. Revised joint draft resolution.
- A/C.6/L.389, 1 p., December 14, 1956. Ceylon, India, and Indonesia: amendment to joint draft resolution.
- A/C.6/L.391, 1 p., December 17, 1956. Belgium: amendment to the joint draft resolution.
- A/C.6/L.392, 1 p., December 18, 1956. Argentina, Chile, Ecuador, El Salvador, Haiti, Mexico, Paraguay, and Peru: amendments to the joint draft resolution.
- A/C.6/L.393, 1 p., December 18, 1956. Afghanistan, Austria, Bolivia, Czechoslovakia, Nepal, and Paraguay: amendment to the joint draft resolution.
- A/C.6/L.395, 23 pp., December 21, 1956. Statement by J. P. A. Francois, Rapporteur of the International Law Commission, at the 500th meeting of the 6th Committee.
- A/C.6/L.396, 2 pp., December 19, 1956. Israel, Mexico, and Peru: amendments to the joint draft resolution.
- A/C.6/L.397, 2 pp., December 19, 1956. Statement of financial implication submitted by the Secretary-General.
- A/C.6/L.398, 3 pp., December 21, 1956. Text of the draft resolution adopted by the 6th Committee at its 505th meeting.

TRADE AGREEMENTS AND TARIFFS:

Operation of the Trade Agreements Program. Ninth Report, July 1955-June 1956, 390 pp., processed. United States Tariff Commission, Washington 25, D. C., 1957. During the period covered by this report, the United States and other contracting parties to the General Agreement on Tariffs and Trade met at Geneva, Switzerland, for the fourth round of multilateral tariff negotiations sponsored by the Contracting Parties. This report describes the negotiations at Geneva, and analyzes the concessions that the United States granted and obtained in those negotiations. It also discusses other important developments that occurred during 1955-56 respecting the trade agreements program. These include proposals of legislation that authorize the United States to participate in the Organization for Trade Cooperation; actions of the Contracting Parties relating to the general provisions and administration of the General Agreement; actions of the United States relating to its trade agreements program; and changes in tariffs, exchange controls, and quantitative trade restrictions that were made by countries with which the United States has trade agreements.

TRANSPORTATION:

Protecting Perishable Foods during Transportation by Truck, by Harold D. Johnson and F. L. Breakiron, Agriculture Handbook No. 105, 73 pp., illus., printed, 30 cents. U. S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C., December 1956. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Motortruck equipment is available to provide the optimum temperature and humidity for perishable commodities during transportation. However, the requirements of different commodities vary widely, and it is necessary that the shipper or trucker know the specific needs of the commodity being transported so that he may use the right equipment in the right way. Although this handbook describes the proper care of perishable agricultural commodities during transportation by motortruck, some of the information might be of interest to those handling fishery products.

Suggested Methods for Checking Temperatures of Fresh and Frozen Food Shipments, by Robert F. Guilfooy and Harold D. Johnson, Marketing Research Report No. 150, 9 pp., illus., processed, 5 cents. U. S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Although this publication contains methods for checking temperatures of fresh and frozen agricultural food products in transit, some of the information might be of interest to those handling fishery products.

TUNA:

"Additional Observations on the Biology of the Northern Bluefin Tuna, *Kishinoella tonggol* (Bleeker), in Australia," by D. L. Serventy, article, Australian Journal of Marine and Freshwater Research, vol. 7, no. 1, April 1956, pp. 44-63, illus., printed. Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C. 2, Victoria, Australia.

Changes in the Size Structure of the Yellowfin Tuna Population of the Tropical Eastern Pacific Ocean from 1947 to 1955, by Gordon C. Broadhead, vol. II, no. 1, 20 pp., illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1957. Both the analysis of the logbook data and the study of the hook sizes used by the fleet indicate that in recent years, coincident with the higher fishing intensities, there has been a decrease in the proportion of large yellowfin tuna and a corresponding increase in the proportion of small yellowfin tuna in the catch from the Eastern Pacific. As the baitboat fleet takes about 85 percent of the total catch of yellowfin tuna from this region, this conclusion appears warranted from the study of its catches. The general indications of changes in the average size of the yellowfin tuna landed by the commercial fishery, correlated with changes in the fishing effort during the past decade, while not entirely

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conclusive, corroborate the strong statistical evidence that the recent levels of fishing intensity have been sufficiently high to affect the stocks of yellowfin tuna in the Eastern Tropical Pacific, and further suggest that the returns from tagging experiments are far below the true levels of exploitation of the stocks.

"Distribution, Age and Growth of Eastern Pacific Albacore (*Thunnus alalunga* Gmelin)," by J. M. Partlo, article, Journal of the Fisheries Research Board of Canada, vol. 12, no. 1, January 1955, pp. 35-60, illus., printed. Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B. C., Canada.

"The Fishing's Fine!" by John T. Foster, article, The Canner and Freezer, vol. 124, no. 1, January 7, 1957, pp. 13-15, illus., printed, single copy 25 cents. Canner Publishing Co., 105 W. Adams St., Chicago 3, Ill. Discusses the Gulf Coast tuna fishery and the possibility of it becoming a major new industry. The author states that "Interests in the Pascagoula-Biloxi, Miss., area foresee the time when the Gulf Coast, with its Gulf-caught yellowfin tuna, will be a serious competitor to Southern California, the citadel of the United States tuna industry. West Coast interests, of course, foresee nothing of the sort. They concede, however, that the Gulf Coast might engender a small tuna industry, and they are keeping a close watch on developments."

"The Southern Bluefin Tuna, *Thunnus thynnus maccoyii* (Castelnau), in Australian Waters," by D. L. Serventy, article, Australian Journal of Marine and Freshwater Research, vol. 7, no. 1, April 1956, pp. 1-43, illus., printed. Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, 314 Albert Street, East Melbourne, C.2, Victoria, Australia.

A Study of Changes in Fishing Effort, Abundance, and Yield for Yellowfin and Skipjack Tuna in the Eastern Tropical Pacific Ocean, by Bell M. Shimada and Milner B. Schaefer, Bulletin--vol. 1, no. 7, pp. 351-469, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956. A study was undertaken to determine from the historical records of the fishery the effects of fishing upon the stocks of yellowfin and skipjack tuna of the Eastern Pacific region and to evaluate the present condition of these stocks with respect to the maximum equilibrium yield. It was concluded from the inverse relationships exhibited between changes in apparent abundance and fishing effort that the amount of fishing has had a real effect upon the stock of Eastern Pacific yellowfin tuna, taken in the aggregate, over the period studied. The evidence suggests also that for this species the in-

tensity of fishing in some recent years has reached and might even have exceeded the level corresponding to the maximum equilibrium yield. For skipjack, no correlation was found between changes in population size with changes in fishing intensities thus far encountered, indicating that the fishery has had little, if any, apparent effect on the abundance of this species. It therefore appears that further increases in the sustainable total catch of yellowfin tuna above that already attained cannot be expected from increased fishing effort, whereas, for skipjack, it seems possible to increase the average annual catch on a sustained basis without detriment to the welfare of the resource.

UGANDA:

The Fishes of Uganda--II, by P. H. Greenwood, illus., printed. (Reprinted from The Uganda Journal, vol. 20, no. 2, September 1956, pp. 129-165.) East African Fisheries Research Organization, Jinja, Uganda.

Some Aspects of the Respiration of Six Species of Fish from Uganda, by G. R. Fish, 10 pp., illus., printed. (Reprinted from The Journal of Experimental Biology, vol. 33, no. 1, pp. 186-195, March 1956.) East African Fisheries Research Organization, Jinja, Uganda.

UNION OF SOUTH AFRICA:

The South African Pilchard (SARDINOPS OCELANOTA) and Maasbanker (TRACHURUS TRACHURUS), Bird Predators, 1954-55, by D. H. Davies, Division of Fisheries Investigational Report No. 23, 40 pp., illus., printed. (Reprinted from Commerce and Industry, September 1956.) Department of Commerce and Industries, Division of Fisheries, Pretoria, Union of South Africa. Reports on the second year of investigation into the feeding habits of three important fish-eating birds of the main pelagic commercial fishing area of St. Helena Bay off the West coast of the Union of South Africa.

UNITED KINGDOM:

Report on Enquiry into the Costs of Distributing White Fish, 47 pp., printed. White Fish Authority, Tilbury House, Petty France, London, S.W.1, England, 1956. The main purpose of this study was to secure representative information about the costs of distributing white fish. This report explains the procedure and methods used in the study, and includes a number of tables summarizing and analyzing the sales, expenses, and margins of the 4 main groups of distributors--port wholesale merchants, inland wholesale merchants, fishmongers, and fish friers. It also gives an estimate of the aggregate value of white fish bought and sold by each of the above groups, and a synthesis of the retail selling price of cod fillets.



TAGGED YELLOWFIN AND SKIPJACK TUNA ROAMING EASTERN PACIFIC

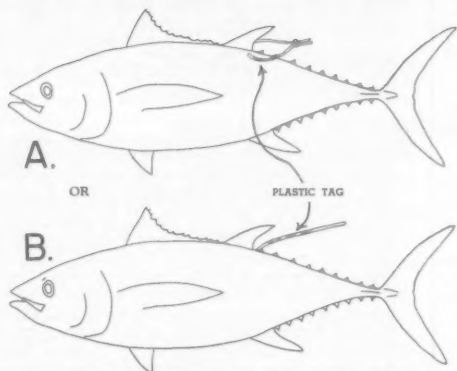
The Inter-American Tropical Tuna Commission, with the cooperation of the tuna fleet, is releasing marked yellowfin and skipjack tuna throughout the eastern Pacific (California to Peru). The fish bear EITHER type A. or B. tag as shown below. Each tag is numbered and has the legend "Return Tuna Comm. San Diego" printed on the plastic.

To stimulate interest in the program, the Commission will pay a reward of one dollar (\$1.00) for each tag returned and in addition will conduct a drawing each year

and will award the sum of \$300.00 in cash to the person who returned the tag number which is drawn. The tags should be returned to a staff member or mailed to the Inter-American Tropical Tuna Commission.

\$300 REWARD

TAGGED YELLOWFIN & SKIPJACK TUNA



The tags are short pieces of plastic tubing, of different colors, which are attached to the fish immediately after the second dorsal fin. Each tag bears a serial number and the legend "Return Tuna Comm. San Diego." Only bona fide tags will be eligible for the annual drawing and the Commission reserves the right to make all identifications. In the event a tag number is marred, or otherwise damaged beyond legibility, the Commission shall, for the purpose of the drawing, substitute a different tag number not used during the year.

To be eligible for the drawing, tags must be mailed to the Commission or returned to a staff member. All senders of bona fide tags will be notified by mail that their entries are eligible.

The Commission will conduct a drawing annually at a time and place specified by the Commission. All bona fide tags returned between March 1 and December 31, 1957, will be entered in the 1957 drawing and thereafter all tags returned during a calendar year will participate in that year's drawing.

The drawing shall be held publicly, and in an impartial manner to be determined by the Commission, and \$300.00 in cash, will be presented by the Commission to the person who returned the tag number drawn.

In all matters relating to the conduct and results of these drawings, the decision of the Commission shall be final. The Commission shall not be liable for any legal action concerning the drawings, and reserves the right to discontinue the same at any time.

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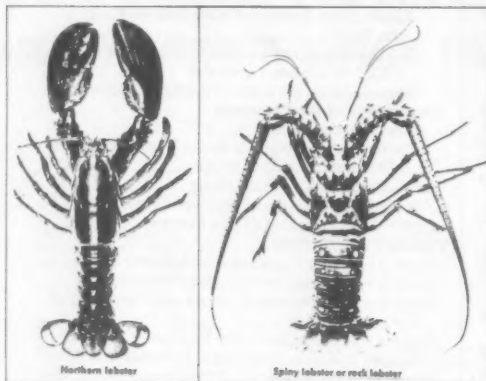
Pps. 1-8, & 17--F. Bruce Sanford; p. 67--Todd Studios, St. Louis, Mo.; pp. 69-70--Rex G. Schmidt.

LOBSTER COOKERY BOOKLET

Not only recipes for cooking lobsters but illustrations on how this shellfish should be eaten are included in a new fish-cookery publication, *How to Cook Lobsters*, released May 21 by the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service. The booklet contains 33 choice recipes developed and kitchen-tested by the Service's staff of home economists.

Two kinds of lobsters--the large northern and the spiny or rock lobster--are familiar to most housewives in this country.

The northern lobster is particularly prized by gourmets for its sweet pink and white meat. These lobsters are found along the Atlantic Coast from Labrador to North Carolina but the bulk of the United States catch is made along the Maine coast. They usually weigh from 1 to 3 pounds when alive.



The spiny, or rock lobster, found off Florida and southern California ranges through the tropical, subtropical, and temperate waters of the Atlantic, Pacific, and Indian Oceans.

The spiny lobster can be easily distinguished from the northern lobster by the absence of the large heavy claws that are so characteristic of the northern lobster, the presence of many prominent spines on its body and legs, and its long slender antennae. The meat of the spiny lobster comes almost entirely from the broad tail.

Modern handling and transportation methods now make it possible for people living far inland to enjoy the tender delicately-flavored meat of the lobster.

The cooked meat of the northern lobster, picked from the shell, is marketed fresh, frozen, and canned. Frozen spiny lobster tails have gained wide popularity since their appearance in the market and they can now be purchased throughout most of the United States.

Some of the recipes included in the new publications are: Lobster and Cheese Delights, Lobster and Orange Cocktail, French Fried Spiny Lobster Tails, Baked Stuffed Lobsters with Cheese, Lobster Thermidor, Lobster Newburg, Lobster Tarts, Lobster in Sour Cream, Lobster and Walnut Sandwiches, and Lobster Waffles.

A page of five pictures is devoted to illustrating the essential steps in "how to eat a lobster" so that only the shell is left.

Generously illustrated, *How to Cook Lobsters* is No. 11 in the Service's Test Kitchen Series of fish-cookery publications. It is sold for 20 cents a copy by the Superintendent of Documents Government Printing Office, Washington 25, D. C.

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